CURRENT HOUSING RESEARCH

VOLUME 11, NUMBER 2

WINTER 2004-2005

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CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or research highlights listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
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Email: chic@cmhc-schl.gc.ca

COMPLETED REPORTS REQUESTED

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INTRODUCTION

Under Part IX of the National Housing Act, the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced two times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at chic@cmhc-schl.gc.ca

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "Completed Report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

CMHC's External Research Program

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and non-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made annually to support research investigations into important questions, problems, and issues affecting Canadian housing. CMHC is interested in receiving applications on topics related to existing CMHC housing research.

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or under-graduate level are not eligible to apply. Students may be hired to assist in conducting the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must apply as a private consultant, and the proposed research must not be part of, or interfere with his/her regular work. CMHC employees are not eligible to receive grants under this Program.

To obtain the Guidelines and Application Form (product #62964):

- visit our Web site at http://www.cmhc-schl.gc.ca;
- e-mail: erp@cmhc-schl.gc.ca; or
- call 1 800 668-2642.

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TECHNICAL RESEARCH

ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL

This project responds to opinion that house designs found in Aboriginal communities are inappropriate and that perfectly good building materials exist on reserve but are never used. The project assumes that in fact there are a significant number of examples where off the shelf house designs have been adapted and where local material has been incorporated. The project will identify these examples, and document a selected number of them as case studies. The case studies will produce material suitable for dissemination. The general approach is:-- to build an inventory of past initiatives on increasing the Aboriginal relevance of housing design and on assessing the feasibility of using local materials;-- to select a range of examples from the inventory for case study analysis; and-- to draw conclusions along the lines of "lessons learned." This project's focus was changed from looking at housing design for new homes to looking at how existing homes have been adapted. An initial scan indicated too few suitable examples of new construction with relevant design features.

CMHC Project Officer : *Phil Deacon* CIDN : 22910200

Division : Policy and Research *Division* STATUS : Ongoing

AVAILABILITY : Product is not yet available

BUILDING A SUSTAINABLE FUTURE: SEABIRD ISLAND FIRST NATION SUSTAINABLE COMMUNITY DEMONSTRATION PROJECT

The Seabird Island First Nation near Agassiz, BC, in partnership with CMHC, the Department of Indian and Northern Affairs (INAC) and Broadway Architects (Sieniuc + de Ridder) of Vancouver built a sustainable community demonstration project. This project consisted of seven homes that incorporated CMHC's Healthy Housing and FlexHousing design concepts. It is the first on-reserve development of its kind in the world. Six of these homes were funded within the guidelines of CMHC's Non-Profit On-Reserve Housing Program (Section 95), while the seventh home was co-funded by CMHC, INAC and more than 20 sponsors.

The main goals of this project included:

- to demonstrate an integrated approach to designing sustainable housing
- to develop housing models that address key housing issues facing Aboriginal people living on reserve across Canada and to provide viable, long-lasting solutions for improving the housing stock on reserves
- to incorporate traditional design elements reflecting the community's culture and heritage.

The Seabird Island project forms part of the Seabird Island First Nation's Sustainable Community Plan. The basic concepts of sustainable planning are addressed in the report and these include the following attributes: affordable, durable, energy efficient, achievable, flexible, healthy, environmentally responsible and community oriented. These sustainable planning principles are illustrated by short descriptions and diagrams of rainscreens, a wind turbine, solar roofs, earth tubes and radiant heat floors and preheated domestic water.

The report also offers a step-by-step description of how other First Nations can implement a sustainable community project and also includes a checklist of sustainable features. The report concludes with a listing of the main partners in the project and their roles as well as a listing of sponsors and their business areas. A product directory of the main building suppliers with their contact information is also provided.

Prepared by Broadway Architects. CMHC Project Officer: Allan Dobie. Vancouver: Indian and Northern Affairs Canada, Seabird Island First Nation and Canada Mortgage and Housing Corporation, 2003. 36 pages

Note : Aussi disponible en français sous le titre : Bâtir un avenir écologique : Première Nation Seabird Island projet de démonstration - collectivité durable

STATUS : New Completed Report Order number 63553

AVAILABILITY : CMHC Information Products

DEVELOP A FIRST NATIONS RENO SERIES INSPECTION AND SPECIFICATION WRITING FOR EXISTING DWELLINGS CURRICULUM

In partnership with Ontario First Nations Technical Service Corporation (OFNTSC), an inspection of existing homes course for First Nation's inspectors will be developed.

CMHC Project Officer : *Alain F Croteau*
CIDN : 23141500
Division : Assisted Housing Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MOLD MATTERS: A RESOURCE GUIDE FOR FIRST NATIONS HOUSING PROVIDERS

This Resource Guide is a practical list of sources for information that can lead First Nations to become knowledgeable and expert on how to deal with moisture and mold problems. Many of the resources, programs and services can also assist First Nations to better build, renovate and maintain homes which are less likely to develop problems.

This Resource Guide will be useful for individuals who are involved in housing and may have to deal with moisture and mold problems. These people include: housing managers, housing co-ordinators, housing maintenance and repair staff, technical service providers, builders, renovators.

The Resource Guide is divided into the following seven sections:
- Understanding Mold
- Preventing and Eliminating Mold
- Home Maintenance
- Quality House Construction
- Comprehensive Community Planning and Housing Policy Development
- Government Programs
- Directory of Resources

Ottawa: Canada Mortgage and Housing Corporation, 2003. 1 loose-leaf volume.

Note : Aussi disponible en français sous le titre : Moisissure : une matière nuisible d'importance : guide des ressources disponibles pour les fournisseurs de logements des Premières Nations

STATUS : New Completed Report Order number 63432
AVAILABILITY : CMHC Information Products

REMOTE FIRST NATION SUSTAINABLE DEVELOPMENT

Nasko is a remote First Nation community in British Columbia with no water and waste treatment systems and with housing that is not connected to the electrical grid. The community is in dire need of these basic facilities, however, conventional infrastructure does not exist and would be too costly to install. Micro-systems may be feasible and viable to address the need. A micro-infrastructure system (e.g. Eco-Nomad) can provide communal water, waste water and basic power supply. Rehabilitation of the existing units, including basic plumbing and electrical fixtures, is being undertaken with assistance of the Residential Rehabilitation Assistance Program (RRAP).

CMHC Project Officer : *Alain Croteau*
CIDN : 30581500
Division : Assisted Housing Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS

The objective of this project is to develop a sustainable community site plan, infrastructure plan and healthy house designs for approximately thirty homes in cooperation with the community of Tyendinaga. The intention of this project is to demonstrate that when alternative infrastructure options, land use patterns and high performance homes are explored simultaneously as an integrated design solution that improvements can be made in all these categories without an overall price increase. The integrated participatory design process will include community workshops involving both the immediate community as well as the broader Ontario First Nations community and design professionals. The results of the workshops and the resulting community and house designs will be published in a report and the first healthy high performance home will be available for public viewing for a period of one year. The project team has preliminary plans and designs ready for presentation at the second workshop with the Tyendinaga community.

CMHC Project Officer : *Chris Ives* ***CIDN*** : 24080200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UPDATING AND EXPANDING FIRST NATIONS IAQ/MOLD TRAINING

On the basis of the results of a focus group consisting of First Nations and CMHC IAQ trainers, the existing CMHC IAQ/mold training program for First Nations will be revised and expanded. New curriculum will also be developed for non-technical audiences. Selected First Nations trainers will be trained in Train the Trainers sessions to deliver the new curricula. Pilot workshops will be evaluated and any necessary adjustments to the new curricula may be completed.

CMHC Project Officer : *Virginia R Salares* ***CIDN*** : 30211500
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UPDATING THE FIRST NATIONS BUILDERS SERIES TRAINING MATERIAL

This project's objective is to produce a curriculum that will assist in improving the level of technical proficiency and confidence of First Nations builders and technical service providers across Canada. The contractor will also ensure that the training materials produced are relevant to the needs of First Nations trainers who will ultimately be delivering the curriculum.

CMHC Project Officer : *Alain F Croteau* ***CIDN*** : 26651500
Division : Assisted Housing Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

NOTE: See also p. 71-77

ACOUSTICS

CASE STUDY: RETROFIT ACOUSTIC TREATMENTS IN A HERITAGE APARTMENT BUILDING

Several units in a five-story 1927 apartment building in Ottawa were recently renovated. The original walls and ceilings were finished with lath and plaster and some walls were balloon framed, in which the vertical framing is continuous for several floors. The owner tested the noise reduction of the floor between two apartments of identical floor plans, one above the other, and wanted to improve the sound isolation between the apartments. Test data on STC and IIC ratings for new materials and construction can be found in the National Building Code. However, little data is available on the sound transmission characteristics of earlier construction with lath and plaster. A retrofit project was undertaken with advice from an acoustic specialist and support by CMHC.

The acoustical effectiveness of several retrofit techniques for the floor/ceilings in the apartment were tested and documented on the basis of technical merit, cost, and airborne sound and impact isolation. Two retrofit strategies were undertaken; the first involving the removal of the existing lath and plaster ceiling and its replacement with drywall on resilient channel supports; the second involving the application of drywall on resilient channel supports over the lath and plaster ceiling, which had been perforated with holes to reduce the potential of acoustic coupling. The ceiling cavities were filled with sound insulation in all cases.

All retrofit treatments improved the acoustic isolation of the floor assembly. However, the most expensive strategy that involved removal of the existing ceiling improved the acoustic performance of the floor assembly less than the cheaper strategy. The reasons for the inferior performance of the more expensive repair are not identified in this study; however, it is believed that the balloon framing might have caused some sound leaks in the vicinity of the first retrofit strategy, which contributed to a decrease in the apparent sound performance of the floor.

Prepared by Hugh Williamson Associates Inc. Ottawa: Canada Mortgage and Housing Corporation, 2004. 19 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Retrofit(W).pdf

BASEMENTS, FOUNDATIONS & CRAWLSPACES

BASEMENT FLOOR OPTIONS FOR EXISTING HOUSES

This work covers three research studies that deal with residential foundations. One project looked at the various methods for retrofitting finished floors to existing basements, to see if there is a preferable method for comfort and durability (*Dry and Comfortable Floors in Existing Basements*). One project field tested the energy performance of foil-coated, bubble-wrap insulation under new slabs, and found it to be significantly less insulating than foam products (*Comparison of Under-Floor Insulation Systems*). The third project examined the performance and durability of foundation wall systems that have been retrofitted for five years or longer with spray-applied, polyurethane insulation (*Rendement du polyuréthane giclé sur les murs de fondation*). The polyurethane foam after many years is generally in very good shape, with no deterioration or loss of rigidity.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Canadian Housing Information Centre

CIDN : 30830200
STATUS : Completed

COMPARISON OF UNDER-FLOOR INSULATION SYSTEMS: FINAL REPORT

The purpose of this study was to monitor and evaluate the thermal and economic performance of three under-floor insulation products over a heating season. Instrumentation was installed in four houses, three with under-floor insulation and one with no insulation beneath the slab. Data was gathered from February to June 2004. The temperature profiles through the floor for bubble pack and steel-skinned polyurethane insulations were compared to the performance for no insulation and 50 mm of XPS, which are materials with known properties. The effective RSI-values for in-situ performance for the three insulations were calculated from the monitored data. The material cost, in conjunction with the in-situ thermal resistance was used to compare the cost/benefit performance of the three insulation materials.

Prepared by Enermodal Engineering Limited. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2004. 33 pages

Note: No. 04-127 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Under-Floor%20Insulation(web).pdf

DRY AND COMFORTABLE FLOORS IN EXISTING BASEMENTS: FINAL REPORT

A literature survey was carried out to identify options available for finishing basement floors in existing houses which are subject to minor, moderate or major types of moisture problems. The following six types of floor finishing options were identified: paints and coatings, cleanable and disposable coverings, conventional area coverings, built-up floor systems, non-insulated built-up floor systems and insulated drainage mats with a new sub-floor. The suitability of each of these floor finish options was assessed for the three classes of moisture problems.

Prepared by Gary Proskiw, Proskiw Engineering Ltd. And Bert Phillips, Unies Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004. 42 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR%20Dry%20&%20Comfortable(w).pdf

LONG TERM PERFORMANCE OF SLAB-ON-GRADE FOUNDATIONS IN REGINA SASKATCHEWAN

This External Research Program project is an evaluation of the long term performance of slab-on-grade foundations built in Regina, Saskatchewan in the late 50s and early 60s. Several houses have been evaluated for foundation movements and general occupant satisfaction with the performance of these houses. This project focuses on the climatic and geological conditions that contributed to the slab movements. A draft consultant's report is being reviewed. Research results will be available in late 2004.

CMHC Project Officer : *Ken Ruest*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 26470222
STATUS : Ongoing

NEUTRALISATION DU POTENTIEL DE GONFLEMENT DES REMBLAIS DE FONDATION PAR DES INJECTIONS DE COULIS SPÉCIAUX : RAPPORT FINAL

Numerous cases of buckling were reported in the Saint Lawrence Lowlands: these cases are related to oxidation of sulphur (mainly pyrite) in the backfill aggregate or the underlying rock. Therefore, a method of stopping expansion of the backfill must be developed and validated. The Université de Sherbrooke's Rock Mechanics and Geology Engineering Laboratory (LMRGA) presented a research proposal to the Canada Mortgage and Housing Corporation (CMHC) to conduct a technical feasibility study of grouting foundation backfill. Tests aimed at stopping expansion were conducted in order to coat the aggregate, thus avoiding the sulphur oxidation responsible for expansion following the oxidation/neutralization process.

The method was first tested using CBR (California Bearing Ratio) moulds containing reactive aggregate. A larger cube was then used to simulate foundation walls. The aggregate studied is an expansive pyritic shale. Various pozzolanic-blastfurnace cement-based formulations with additives (Eucon37 superplasticizer and Euco-NivoL anti-bleeding agent from Euclid Admixture Canada) were necessary in order to identify the appropriate procedure for an acceptable injection.

Successful injection is closely linked to the permeability of the backfill, which in turn depends on granulometric distribution and degree of compaction. As the height of the CBR mould is fairly similar to that of a basement backfill, the proposed injection method could be applied to basements affected by expansion problems. On the other hand, injection can prove difficult in garage backfill that is approximately 1m thick.

Prepared by Achour Bellaloui, Gérard Ballivy, Patrice Rivard. CMHC Project Officer: Jacqueline I Meunier-Bureau. Ottawa: Canada Mortgage and Housing Corporation, 2003.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/RR-neutralisation%20FR.pdf

PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE: FINAL REPORT

Municipal sewers can be filled to capacity with rain water during large storm events. When sewers are surcharged, they can back up into basement drains and cause flooding inside houses, with significant costs and potential health effects. This report describes the mechanisms of basement flooding during these events and describes ways to prevent these occurrences. The report starts with a review of recent basement flooding literature. The research included a survey of 24 Canadian municipalities, and the report lists the types of sewer systems in these cities, the frequency of flooding events, what they are doing to minimize flooding, and the details of flood prevention programs. Several municipalities have information on flood prevention on their web sites, and this material is referenced. This report concludes with recommendations, both for governments and homeowners, on how to avoid basement flooding due to sewer surcharge and why this should be a priority.

Prepared by Ted Kesik and Kathryn Seymour. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 95 pages

Note: No. 04-104 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR_Practical_measures_(w).pdf

PRESERVED WOOD FOUNDATION WALL CAVITY ARSENIC AND MOLD STUDY

A field study was conducted to investigate the airborne concentrations of arsenic and total fungi in the finished exterior basement wall cavities in a group of ten houses constructed with pressure treated wood foundations (PWFs). The houses ranged in age from 18 to 26 years old and were located in various locations throughout the province of Saskatchewan, Canada.

Air samples were collected by drawing air from three or four different locations in the lower portions of the finished (insulated and sheeted) exterior wall cavities in each house. The air samples were analyzed for temperature, relative humidity, airborne arsenic concentration and total fungi concentration and fungi type. Physical observations of the general condition of the exterior and interior of the foundation walls were also collected.

The results from the study indicated that the airborne arsenic levels in the exterior wall cavities were very low. All of the measured arsenic concentrations were at or below 0.00039 ug/L. The airborne total fungi concentrations and fungi types were highly variable but frequently indicated the presence of fungal contaminant sources. The visual condition of the exterior and interior foundation walls was not a reliable predictor of the wall cavity airborne fungi characteristics.

Prepared by Figley Consulting Associates Ltd. CMHC Project Officer: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Research Report). 16 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

RENDEMENT DU POLYURÉTHANE GICLÉ SUR LES MURS DE FONDATION: RAPPORT FINAL

In addition to being a more costly insulation method, should there be any doubt about the long-term performance of sprayed polyurethane on interior walls?

In order to shed light on this issue, this research consisted in evaluating the performance of polyurethane from the standpoint of its effectiveness and bond durability on different types of foundation walls (poured concrete, concrete blocks or rubble) and providing an opinion on the quality of its cellular structure after five years or more of installation.

The results are conclusive: sprayed polyurethane behaves very well in the medium and long terms from the standpoint of its adhesion to the foundation and adjacent materials, the conservation of its cellular properties and its homogeneity.

Prepared by Jean-Claude Faucher, Consul-Tech JCF, Service-conseil technique en habitation. CMHC Project Officer: Don Fuger. Ottawa: Canada Mortgage and Housing Corporation, 2004. 48 pages

Note: No. 04-118 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/dc20079296%20finalweb.pdf

DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC is contributing to a partnership of National Building Code stakeholders to develop transitional training material for the objective-based codes which will include pilot testing. Content will provide for training on the structure, and new information to be included in the 2005 objective-based code, on the evaluation of alternative solutions to be allowed under objective-based codes (for example, using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material will be developed at their level and then adapted for other stakeholder groups to meet their needs. This multi-year project will develop according to the following schedule:

Phase I - Training needs assessment (completed);
Phase II - Development of training material (underway, to be completed by end of 2004);
Phase III - Pilot-testing and completion of training material (early 2005).

The training material will be available for the various audiences in three delivery modes:

A. Basic Awareness
B. Independent Learning
C. Classroom/Workshop Delivery by instructors/facilitators

CMHC Project Officer : Joe Cottitto
Division : Policy and Research Division
AVAILABILITY : Seminar/training is not yet available

CIDN : 27000200
STATUS : Ongoing

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. A new draft of the document is available. The CGSB will be re-balloting the draft of this standard.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 19710200
STATUS : Ongoing

BUILDING MATERIALS

CHARACTERISTICS OF EFFECTIVE WATERPROOF SEALERS FOR MASONRY

The objective of this project is to study the vapour permeability characteristics of effective sealers applied to masonry walls; the issue is not one of stopping water absorption/penetration into the masonry, since most sealer products are effective in this role, but of assessing how the sealers affect drying of the masonry. CMHC in partnership with Masonry Canada, is providing funds to the University of Waterloo to undertake this preliminary study. This phase of the project will investigate the performance of 5 sealer types on individual masonry units and small masonry panels. Computer modeling and parametric analysis will be undertaken to demonstrate the impact of insulation levels, driving rain exposure, water absorption, orientation, imperfect air barrier, etc., for five representative Canadian climate zones. The project is expected to be completed by December of 2005.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 25610200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

MATERIAL PROPERTIES OF STRAW LIGHT CLAY INFILL SYSTEMS

This External Research project established the material composition and properties of an alternative building product, Straw Light Clay (SLC) infill systems. Product testing will help to demonstrate its suitability for use in Canadian climates. The contractor cast samples and had them tested in a laboratory for density, strength, permeability, etc. and drafted a final report which is under review. The research should be published in early 2005.

CMHC Project Officer : *Don Fugler* **CIDN** : 25250208
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

RELATIONSHIP BETWEEN MOISTURE CONTENT AND MECHANICAL PROPERTIES OF GYPSUM SHEATHING

The purpose of this study is to examine the relationship between moisture content and mechanical properties of gypsum sheathing products (such as standard gypsum wall board, exterior grade gypsum, glass-fibre faced gypsum). Specific properties to be examined include: adhesion or delamination of facer material, ability of the sheathing to resist fastener pull-out, flexural strength of the sheathing, for seismic considerations and as a common index of overall mechanical integrity and water absorption. The study will also determine whether hand-held electric resistance meters are suitable for measuring moisture content (accurately) or if some new apparatus or protocol is required. The project is expected to be completed by December of 2004.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 26470221
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

STATIC AND DYNAMIC EARTHQUAKE TESTING OF RAINSCREEN STUCCO SYSTEMS FOR BRITISH COLUMBIA RESIDENTIAL WOOD FRAME CONSTRUCTION

Without substantial improvements to the earthquake preparedness of British Columbia's housing infrastructure, the consequences of a large earthquake could be devastating. Non-structural building components, such as stucco cladding and drywall, can have a major influence on earthquake performance. This research evaluated the earthquake performance of rainscreen stucco cladding (i.e. air cavity behind it) vs. non-rainscreen. Both systems were shown to have the potential to eliminate major structural earthquake damage in residential wood-frame buildings (single family and multi-unit construction). However, refinements to current stucco construction practice will make a major contribution to capitalizing on this mitigation potential. In particular, the use of 50-mm (2 in.) staples as lath fasteners should replace the current practice of nails, and plywood strapping secured with roofing nails should be used in rainscreen stucco construction. This CD-ROM includes the revised 2003 research report, the research highlights, the 9 appendices, and a video of the seismic tests.

Study undertaken by the University of British Columbia, Dept. of Civil Engineering under contract to Canada Mortgage and Housing Corporation (CMHC). Principal investigators: Helmut G.L. Prion, Carlos E. Ventura, M. Kharrazi, and Graham B. Taylor. Funded by CMHC, the Homeowner Protection Office, and the British Columbia Housing Management Commission. CMHC Project Officer: Silvio Plescia. Ottawa: CMHC, 2004. 1 CD-ROM

Note: No. 03-127 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed CD-ROM and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

TEMPERATURE AND MOISTURE CONDITION OF WOOD STRUCTURAL MEMBERS EMBEDDED IN INTERIOR INSULATED SOLID MASONRY WALLS, MONITORING OF THE GROSH BUILDING, STRATFORD, ONTARIO

Two projects have been launched to monitor the temperature and moisture content of wood structural members (joists) embedded in interior insulated solid masonry walls. Houses with solid masonry walls in Kincardine, Ontario, and Wolsely, Saskatchewan that have been retrofitted with interior insulation have been fitted with the necessary instrumentation to monitor the moisture and temperature regimes in wood joists embedded in the masonry walls. Based on the monitoring, the long-term durability of the wooden members will be estimated. The outcome of these projects will be used in the formulation of guidelines for insulation retrofits in solid masonry and stone buildings. The projects will be completed by June 2005.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 24290200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

TESTING THE ADHESION OF AIR BARRIER MEMBRANES IN WALL ASSEMBLIES

This project will design and conduct a testing program to ascertain the adhesion performance and risk of air barrier materials and assemblies using recent construction materials in actual assemblies. Specifically, the purpose of the research project is to determine the effect that exposure to sustained environmental conditions, wetting of the substrate, and material compatibility has upon the adhesion strength between air barrier materials and substrates. The full report and a research highlight will be available in December 2004.

CMHC Project Officer : *Luis de Miguel* ***CIDN*** : 25350200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Research highlight is not yet available

CONCRETE

EVALUATION OF A NON-DESTRUCTIVE METHOD FOR MEASURING THE PRE-STRESS FORCE IN UNBONDED TENDONS IN EXISTING POST-TENSIONED CONCRETE BUILDING

The objective of this project is to evaluate the effectiveness of a technique, developed by Halsall and Associates Limited, Consulting Engineers, for in-situ measurement of force in unbonded post-tensioned tendons. Unlike reinforced concrete structures which use reinforcing steel dispersed throughout the structure to carry loads, post-tensioned buildings use highly stressed, steel cables (coated with grease and inserted into plastic sheathing) strategically placed within the concrete slabs to resist the applied loads. The evaluation of post-tensioned buildings and the recommendation of appropriate remedial strategies have been hindered by a lack of diagnostic tools that can effectively assess the load levels in the cables themselves without destroying the cables. This project will identify the strengths and limitations of this technique. The completion date for this project is expected to be the spring of 2005. The results of this evaluation will be made available to engineering practitioners specializing in the investigation and repair of concrete buildings and structures.

CMHC Project Officer : *Silvio Plescia*
CIDN : 23940200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This study was initiated to address concerns raised at a round-table discussion convened by Canada Mortgage and Housing Corporation to discuss concrete deterioration and repair issues for buildings. It was generally agreed that there is no consistent approach to concrete investigations and repairs and that the development of an assessment and repair protocol would be beneficial. In achieving a concrete repair protocol, the first step is to identify the state-of-the-art and the current practice for investigation, repair and monitoring strategies. State-of-the-Art is considered to be the highest level of technology in the field at this time and Current Practice is considered to be the procedures that are in general or prevalent use by most consultants. This project will research current assessment, monitoring and repair strategies for concrete repair employed by engineering consulting firms commonly involved in concrete investigation and restoration projects. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This project is expected to be completed by spring of 2005.

CMHC Project Officer : *Silvio Plescia*
CIDN : 1890 0200002
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CONSUMER PROTECTION

DISCUSSION PAPER ON MEASURING THE SATISFACTION OF NEW HOME BUYERS

This project researched the need and feasibility of a national comprehensive survey and rating system to measure and record the satisfaction of new home buyers with the product and service provided by the builder. The study examined existing customer satisfaction systems and recommended a model which could be applied to new home buyers and would provide fair and unbiased reports that consumers could depend on. The research engaged consumers and industry stakeholders in a consultation about the need and feasibility of such a system and its potential structure. The draft report is complete and is being circulated to the advisory stakeholders. The final report is expected to be available by the end of 2004.

CMHC Project Officer : *Joe Cottitto*
CIDN : 28850200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CONSUMER PROTECTION

EXPANDING THE CONTENT OF THE HOMEOWNER'S MANUAL TO COVER HOMES OF EARLIER VINTAGES

This project will supplement the current content of the Homeowner's Manual with optional material (Fact Sheets) so that it can apply to Canadian houses of earlier construction periods. The process for expanding and enhancing the manual will entail the following elements: 1) Identification of systems and components for which new fact sheets will need to be written; 2) Development of text and illustrations to be included in the manual; 3) Adjusting the current Manual order form to include the new items of customization.

STATUS : Completed

AVAILABILITY : There will be no product for this project

CONTAMINATED LANDS

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project includes contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete and published:

1. A potential soil gas movement problem in a Vancouver high-rise (See abstract below with title "Report on Safe Housing for Lightly Contaminated Lands Research Project: Pacific Place Study Results"); and
2. Heavy metals moving from contaminated fill in Wells, BC. (See abstract below with title "Report on Research Project on Safe Housing for Lightly Contaminated Contaminated Lands: Final Draft Report, Wells, B.C.")

The contractors looked for a third location for several years but were not able to find a willing property owner. This research was terminated with reports and research highlights published on the two sites. Generally, the risks to health found were similar in scale to those predicted by the assessments.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is available

CIDN : N/A
STATUS : Completed

REPORT ON RESEARCH PROJECT ON SAFE HOUSING FOR LIGHTLY CONTAMINATED LANDS: FINAL DRAFT REPORT, WELLS, BC

The objective of this project was to determine the predictive accuracy of site-specific risk assessments that have been carried out for residential sites prior to remediation. CMHC was specifically interested in reassessing indoor pollutant levels in residential housing units, following remediation. Suitable sites for this project were required to: i) have a known degree of soil contamination, ii) be located in Canada, iii) have been cleaned up to a prescriptive standard or preferably to a level established by a risk assessment, and iv) be either in the planning stage, the construction stage, or new (less than one year old). Based on the above criteria, Wells, BC was selected as a suitable site as it met most of the study criteria.

Gold mining and ore processing had been carried out near Wells for over 50 years. Trailings high in arsenic had been used as fill within the residential community. An investigation and clean-up was undertaken and completed by the BC Ministries of Health and Environment in 1993. The clean-up criterion for arsenic in soil was set at 150 µg/g. Following remediation, Golder (1993) was retained to conduct a quantitative risk assessment for risks posed by arsenic in various media to residents of Wells. The primary purpose of conducting the risk assessment was to determine whether the risk levels to residents exposed to town soils containing arsenic concentrations between 30 and 150 mg/g was acceptable (Golder 1993). Based on all of the exposure pathways considered in risk assessment, the conclusion was that the non-cancer and cancer risk to residents of Wells was negligible and that the pathways driving risk were fugitive dust inhalation and lake-side tailings ingestion.

Considering the above, the purpose of the CMHC/Golder (1999) study was to show whether houses adjacent to the highest concentrations of tailings, particularly new houses, were adequately protected by the clean-up criteria set by the BC government study. The objectives of the current investigation were to: i) compare current concentrations of arsenic in soil and dust to those concentrations used in the original risk assessment and ii) reassess the relative importance of soil and dust exposure pathways (e.g., inhalation of household dust) compared to the findings of the original risk assessment.

A total of 22 houses were identified as being suitable candidates for this study and residents of 15 of those houses agreed to participate in the study. Where possible, the current investigation replicated the methods used in obtaining the soil and dust data in the original risk assessment (Golder 1993). Results from three of the fifteen houses were somewhat suspect as major home or yard renovations were in progress. As well, two of the residents ran hospitality-based businesses in their houses, somewhat distorting the residential nature of the study.

The difference between the concentrations of arsenic in yard soil and house dust reported in the current investigation and in the 1993 risk assessment were evaluated using the confidence limit for the difference of means test. The results indicated that concentrations of arsenic in soil were not statistically different from those collected in 1993. However, the dust samples showed roughly twice the arsenic concentrations of the 1993 study and the difference of means tests indicated that mean concentrations of arsenic in dust were significantly different. When the carcinogenic risks were recalculated using the new concentration of house dust, the health risk estimates still fell within acceptable risk levels set by the Province of BC.

Based on the results, potential health risks to residents of Wells were considered acceptable even though concentrations of arsenic in house dust were approximately two times higher in the current investigation than concentrations in the previous risk assessment. Overall, the current investigation confirmed the predictions of the original risk assessment conducted by Golder (1993), which was that the soil clean up level of 150 µg/g arsenic was adequate for the protection of residents in Wells.

Prepared by Golder Associates. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. 51 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

REPORT ON SAFE HOUSING FOR LIGHTLY CONTAMINATED LANDS RESEARCH PROJECT: PACIFIC PLACE STUDY RESULTS

The objective of this project was to evaluate the predictive accuracy of site-specific risk assessments for lightly contaminated lands redeveloped for residential land use through post-remediation and development monitoring. This study presents the results of the research program conducted at an apartment located at the Pacific Place site (Parcel 2), located along the False Creek waterfront, in Vancouver, BC.

Pacific Place, the former site of EXPO '86, is an 82 hectare parcel of waterfront land that has been primarily developed for housing use. The study apartment is located in the immediate area of a former oil-gasification plant with tar contamination. The below-grade component of the structure consists of three stories of parking with apartments above-grade. Contaminants of concern include polycyclic aromatic hydrocarbons (PAH), benzene, toluene, ethylbenzene and xylene (BTEX) and metals. The remediation for this building lot involved the removal of highly contaminated soil to approximately 5 to 6 m depth; however, tar contamination had migrated deeper making complete remediation below the proposed building difficult and uneconomical. Engineering control measures implemented included installation of a clay liner below a portion of the foundation and sealing of building walls.

The risk assessment for this site concluded there would be no significant soil gas migration and intrusion, and that human exposure from these contamination sources would be negligible. To confirm the risk assessment findings, a monitoring program, consisting of measurement of VOC concentrations in soil gas, building sump water, and parkdale (indoor) air, and a tracer test to measure soil gas intrusion were conducted.

The testing program indicated low to non-detect concentrations in sump water. The VOC concentrations in parkade air and soil gas were similar and on the same order as published background levels for residential dwellings. The fact that the parkade and soil gas concentrations were similar suggests that soil gases would not be a significant contributor to parkade and hence residential concentrations. An innovative helium tracer test was subsequently used to estimate soil gas intrusion into the parkade. The test involved injection of helium below the ground floor slab at several injection points, followed by monitoring of helium levels in the parkade. The calculated soil gas entry rate based on the tracer test was about 0.2 m3/hr., or about 10 times lower than a theoretical rate of 2.5 m3/hr. determined from a calculation procedure developed for CMHC.

In summary, there is a small, but measurable, influx of soil gases into the parkade caused by parkade ventilation and depressurization. The contribution of soil gas VOC to the parkade concentrations is low because of the amount of dilution air infiltrated into the parkade or induced by parkade exhaust fans. As well, contaminant concentrations in the soil gases were very low in the samples taken. The findings of this study are consistent with the original risk assessment and confirm that exposure to contaminated soil gases is not a significant exposure pathway for residents.

Prepared by Golder Associates. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. 55 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

NOTE: See also p. 79

ACCELERATED TESTING TO CONFIRM A METHOD TO PREDICT TIME TO FAILURE OF INSULATING GLASS UNITS

This research, under CMHC's External Research Program, will validate an accelerated test method to estimate the failure rate of insulating glass units (IGUs) with a view to ascertain shelf life of units installed in existing buildings. This will allow for more accurate prediction of replacement costs within reserve funds. Insulating glass units in windows have a finite life span and are expensive to replace. A test method has been developed and testing is required to assess its validity. The study will test twelve IGUs under repeated cycles of exposure to elevated temperature and humidity levels. This will increase the cavity moisture content and thus the dew point temperature. Units will be exposed on one side at normal room conditions and varying outdoor temperatures on the other side. A mathematical model will be produced to predict future dew point temperatures and time to failure. Subsequent dew point measurements will prove the model true or false; if false, new models will be developed. By the time failure is achieved, it is hoped that an accurate model for failure prediction can be produced. A research report is expected in the fall of 2005.

CMHC Project Officer : *Luis de Miguel* — ***CIDN*** : 28370218
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDE - WINDOWS

In partnership with Natural Resources Canada and the Homeowner Protection Office, CMHC is developing this comprehensive and practical technical advisory document for architects, engineers, builders, renovators, window manufacturers, window installers and others involved in the design, specification, construction, installation and interfacing of windows within the exterior wall assembly in both low-rise and high-rise residential construction. This document will guide the user in selecting the appropriate window performance criteria for the intended application and to provide installation details to ensure the performance criteria is achieved through the effective continuity of thermal, air, vapour and moisture barriers at the interface between the window units and the wall assembly. The project is expected to be completed by the spring of 2005.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 30870200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATING THE EFFECTIVENESS OF WALL-WINDOW INTERFACE DETAILS TO MANAGE RAINWATER

Based on the need for effective window-wall interface details to manage water intrusion, CMHC is proposing to develop and publish a Best Practices Guide for Window Installation that will be applicable to both low-rise wood frame construction and high-rise buildings. To support the development of the Guide, and the needs of the fenestration, wall cladding and flashing industry, CMHC in partnership with the National Research Council (NRC) is building a consortia of interested North American organizations to evaluate specific window-wall interface details to determine how effective they are in managing rainwater; CMHC and NRC are funding the first year of this 3-year intended study. The Phase 1 study will be completed by end of 2004 at which time the results will be made public.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 27080200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DOORS AND WINDOWS

LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this research project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and the British Columbia Housing Management Commission, was to conduct a detailed review of the Canadian Window Standard CSA A440, together with all its attachments, to review the test requirements related to moisture penetration as outlined in the standards, and to review, assess and evaluate the window certification programs and processes. This research project identified recommended solutions and opportunities for alleviating these moisture problems into the wall assembly from the window/wall interface. This study complements a companion study "Leakproofing Windows, Phase I - Fabrication, Installation and Maintenance" in which the primary window leakage paths and causal factors are identified from insitu window-wall performance records. The CSA A440 Window Standards Committee is considering the adoption of and harmonizing with the North American Fenestration Standards (NAFS). This project also attempts to consolidate the potential impact that NAFS may have on the performance of windows if adopted by the window standards committee. This research project has been completed and the Research Highlight Technical Series 03-125 "Water Penetration Resistance of Windows - Study of Codes, Standards, Testing, and Certification" has been published.

STATUS : Completed Research Highlight

AVAILABILITY : CMHC Information Products and CMHC web site

WINDOW INSTALLATION COURSE - DEVELOPMENT AND DELIVERY

The objective of this project will be to develop a 'Window Installation' course. The course will be directed at those trades, or trades persons, charged with the installation of windows. The course will cover window installation in both low-rise and high-rise construction assemblies. The course will introduce to the installer the fundamental building science concepts required to integrate window and envelope performance criteria. This project will be contracted during the development of CMHC's Best Practice Guide - Windows. This project will be completed by fall of 2005.

CMHC Project Officer : *Silvio Plescia*

CIDN : 30700200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

ENERGY CONSERVATION

AIR LEAKAGE CONTROL DEMONSTRATION PROJECT IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the individual and collective impact of air sealing measures on building envelope air leakage characteristics, building energy consumption, indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures will be documented for common air leakage points. The predictive capabilities of existing air leakage models will be assessed by comparing their estimates of annual energy savings with that actually achieved in practice. This project will be completed by March 2005.

CMHC Project Officer : *Duncan Hill*

CIDN : 30410200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

NEW

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

The potential for energy and greenhouse gas emission reductions in multi-unit residential buildings due to the implementation of energy efficiency measures is being assessed using the building files of the CMHC HiSTAR database. Two projects are currently underway to assess the extent to which multi-unit residential buildings must be retrofitted in order to meet 10%, 20% and 40% reductions in energy use. The studies are limited to the HiSTAR database due to the lack of available information on the total number of multi-unit residential buildings in Canada. In a related, interdepartmental project, an energy and green house gas emission simulator (BESET) has been developed by Natural Resources Canada to analyze the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions can be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The two CMHC reports that are studying the retrofit potential of multi-unit residential buildings will be completed by January 2005.

CMHC Project Officer : *Duncan Hill*
CIDN : 22490200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. CMHC and NRCan plan to develop a load monitoring protocol that will be used to gather data in both single family and multi-unit residential buildings in a consistent and systematic manner. Upon completion of the protocol, load monitoring projects will be conducted in dwellings across Canada. The results of the load profiling literature search will be made available in a CMHC research highlight by December 2004.

CMHC Project Officer : *Duncan Hill*
CIDN : 22010200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CMHC ENERGY EFFICIENCY CASE STUDIES MOLE HILL COMMUNITY GROUND SOURCE HEAT PUMP CONVERSION PROJECT

A project has been initiated to document, as an energy efficiency case study, the conversion of the dwellings of the Mole Hill Community to ground source heat pump systems. The project will describe the situation that led to the decision for the conversion, the design, installation and commissioning, and the post installation performance of the systems. The annual energy use of the project, after the conversion and any resultant cost savings will also be identified. The project will be completed by December 2004.

CMHC Project Officer : *Duncan Hill*
CIDN : 18990200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEMONSTRATION OF BUILDING INTEGRATED PHOTOVOLTAIC POWER

This research undertook three Building Integrated Photovoltaic (BIPV) demonstration projects: (1) a modular house that produces electricity - Home 2000; (2) A Ventilated Photovoltaic Façade; (3) Grid Connected BIPV. These demonstrations by the BC Institute of Technology have shown the professional housing community how photovoltaic panels can be integrated into buildings on a wide range of exterior surfaces including roofs and facades. A key finding was the need for consultants to have access to a detailed design tool for BIPV systems. A final report has been received and is being reviewed.

CMHC Project Officer : *Chris Ives* ***CIDN*** : 23190200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DESIGN SURVEY OF LOW ENVIRONMENTAL IMPACT HOUSING

This research project will provide a documentation of the best existing examples of low environmental impact housing forms (including net zero energy) to date in Canada and internationally in similar climates. The project is supported through the PERD (Panel for Energy Research and Development) program. The goal is to eventually establish criteria and specifications for zero environmental impact housing in Canada, develop best practice models towards achieving this goal, and ultimately demonstrate these "deep green" housing models for Canadian climatic regions. The completed research report is expected in 2005.

CMHC Project Officer : *Thomas Green* ***CIDN*** : 25400200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF A CONTRACTOR'S AIR LEAKAGE CONTROL MANUAL AND SEMINAR SERIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in consultation with members of the air barrier-air leakage control industry, will develop an air leakage control manual for multi-unit residential buildings. The manual will provide contractors with information on how and where air leakage occurs in these buildings and techniques that can be used to seal them. The goal of the project is to provide the training material necessary to support the development of an air leakage control industry that will be available to meet the needs of the multi-unit residential building sector and to promote air leakage control as a cost effective way to reduce energy consumption in buildings while addressing other issues such as building envelope durability and occupant comfort. The content for the manual will be completed by December 2005.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 32080200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

ENERGY AND WATER EFFICIENCY IN MULTI-UNIT RESIDENTIAL BUILDINGS: A USER GUIDE AND TECHNICAL MANUAL FOR PROPERTY MANAGERS AND OWNERS

Implementing energy and water efficiency is a crucial consideration for today's property managers and building owners. Energy and water costs in multi-residential buildings can account for anywhere from 25% to 50% of total operating costs. While amendments to building codes and standards over the past 20 years have improved energy and water performance in newer buildings, over 50% of housing was constructed prior to 1980. Few of those have been upgraded to today's standards of energy efficiency. Improving energy and water efficiency can decrease operating costs, reduce maintenance fees, lower tenant turnover rates, increase the asset value of property, and extend the life of the building.

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), has developed a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document is based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual offers proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems.

Both the User Guide and Technical Manual are designed to assist property managers in implementing an energy and water conservation program in mid- and high-rise residential buildings. They can be used to help organize activities, develop detailed energy and water conservation plans, and provide an understanding of which energy and water efficiency measures are best.

The User Guide provides advice on how to manage activities, from conducting an energy/water preliminary assessment, determining appropriate conservation measures, estimating payback and the development of an energy/water plan.

The Technical Manual outlines in detail more than 60 energy and water conservation measures for multi-unit buildings. Each provides basic details on assessing the viability of measures in relation to the specific requirements of buildings, as well as recommendations on integrating measures into ongoing maintenance, repair and/or renovation/retrofit work. Each measure can be used in isolation, in selected groupings, or integrated into any maintenance, repair and/or renovation/retrofit work on the building.

Note: Individual energy and water efficiency measures have been placed on the CMHC high-rise website as the energy and water efficiency "Tip of the Week". The manual will form a part of the reference material for a series of energy management seminars being organized by the Ontario Non-Profit Housing Association.

Prepared by The Cedaridge Group Ltd., Engineering Interface Ltd., REIC Ltd., and Chalifour Marcotte & Associés. Ottawa: Canada Mortgage and Housing Corporation, 2002, c2004. 207 pages

Order number 63074 Price: $24.95 + GST and handling charges

Nota : Aussi disponible en français sous le titre : Conservation de l'eau et de l'énergie dans les immeubles résidentiels : guide de l'utilisateur et manuel technique à l'intention des propriétaires et des gestionnaires d'immeubles

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

ENERGY EFFICIENCY AND RETROFIT IMPLICATIONS OF BUILDING RECOMISSIONING SURVEY

CMHC, in cooperation with Natural Resources Canada, conducted a literature survey of the availability of recommissioning guidelines and other "tune-up" procedures for multi-unit residential buildings. The survey found that there was no single source of published information for enhancing the performance of multi-unit residential buildings via low and no-cost measures. Information was found to be available for individual measures to improve space heating, domestic hot water, lighting and appliances, building envelope and ventilation systems. Given the absence of recommissioning, or tune-up, guidelines for multi-unit residential buildings but the availability of information for discrete building systems from a wide variety of sources, the project concluded that CMHC should initiate a subsequent project to compile the measures into a single Tune-Up Guide for Multi-Unit Residential buildings. The project is complete. A Research and Development Highlight detailing the findings of the literature search will be published by end of 2004.

CMHC Project Officer : *Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 23590200

STATUS : Ongoing

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa;
2. Dual Fuel Heating System, Oshawa;
3. Energy Efficiency Retrofit of an Apartment Building, Toronto;
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert);
5. The Complete Rehabilitation of the Broadview Apartment building.

The case studies will be published as a part of the CMHC Better Building Series starting July 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 18990200
STATUS : Ongoing

FINANCIAL MEASURES TO REDUCE GREEN HOUSE GASES IN THE HOUSING SECTOR THROUGH ENERGY EFFICIENCY: A SURVEY

The specific objectives of this project were to:

- Identify and describe a long list of existing financial incentives for homeowner energy efficiency improvements in Canada and the United States through a literature review and interviews with key informants;
- Develop seven case studies of the most promising financial incentive programs in order to obtain information on key design and critical success factors through additional key informant interviews;
- Establish a background context of information for use in the potential development of financial incentives for improving residential energy efficiency in Canada.

This final report is structured as follows:

- Section 1 contains market and GHG emission related information for the residential sector and describes the public policy rationale for increasing public investments in residential energy efficiency.
- Section 2 contains a review of GHG emissions from residential housing and related transportation emissions as well as relevant Canadian policy developments.
- Section 3 reviews and defines different types of financial instruments with examples and information on the overall status of their application in Canada and the United States.
- Section 4 provides the rationale for selecting seven case studies for further study.
- Section 5 contains general findings on critical success factors, general market research and design criteria for future program development and consideration.
- Section 6 contains the conclusion and recommendations.

The report provides seven detailed case studies and over sixty general case studies on a wide range of financial measures to improve residential energy efficiency. A number of key 'lessons learned' in terms of their design and implementation for maximum market penetration are provided. These lessons could form the basis of a national home energy efficiency retrofit strategy.

Prepared for: CMHC, NRCan and Environment Canada. Prepared by: Peck & Associates in association with EnerQuality Corporation & Pollution Probe. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2003. 109 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/FINAL-2003WEB-R.pdf

GREENHOUSE GAS REDUCTIONS IN SUBURBAN SETTINGS

This report explores the greenhouse gas (GHG) reductions possible in suburban households through electrical load reduction in the house, and replacing the gas-powered commuter car with an electric vehicle (EV). The goal of the project was to look at innovative ways of reducing greenhouse gas emissions in households, and to help Canadians meet the 'one tonne challenge' set out in the federal government's Climate Change plan.

A base house case was built for typical electrical loads in houses with gas or oil heating systems, with an exploration of a range of standard and innovative appliance, lighting and electronic load reduction options. The scenario was modelled in four Canadian urban centres with large numbers of short and long-haul commuters for Halifax, Montreal, Toronto and Vancouver. Electric vehicles and conversion kits available in Canada and the US are included, as are European production model EVs.

The project shows how to reduce electrical loads by about 60% (or at least 19 kWh daily) for an overall cost of $27,500. This comprises $14,000 for retrofits, $8,000 for heat & domestic hot water improvements, and $5,500 for solar DHW plus 300 watts of photo voltaic panels. The electricity saved could then be used to power an electric vehicle between 80 km (larger EV) to 180 km (small EV). Overall greenhouse gas reductions of up to 13 tonnes annually are possible (versus the average total of 22.2 tonnes per family).

Author: Shawna Henderson. Research undertaken by: Abri Sustainable Design & Consulting. CMHC Project Officer: Christopher Ives. Ottawa: Canada Mortgage and Housing Corporation, 2004. 81 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

HOUSEHOLD ENVIRONMENTAL MONITORING PROJECT

This CMHC External Research Program (ERP) project will examine the potential success of a community-based approach to encourage homeowners to save energy and greenhouse gases, rather than their acting as individual householders. The work has commenced in an Ottawa neighbourhood and will continue to 2006. The NRCan Energuide for Houses program will be used for house testing and to produce recommendations for house modifications. The community group will encourage participation in the process; follow the progress of changes to the house and its heating systems; monitor the effectiveness of measures undertaken; and review with homeowners their expectations and realizations about the process.

CMHC Project Officer *: Don Fugler*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 28370217

STATUS : Ongoing

NEW

MEASURING HOUSING SUSTAINABILITY - ANNEX 31 - ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS

Annex 31 is a project established under the auspices of the International Energy Agency's (IEA) Agreement on Energy Conservation in Buildings and Community Systems, for which CMHC is the designated Operating Agent (project manager). The mandate for the Annex 31 project is to provide information on how tools and assessment methods might improve the energy-related impact of buildings on interior, local and global environments. The ultimate objective is to promote energy efficiency by increasing the use of appropriate tools by practitioners. Through collaborative research and communications by 14 participating countries, the goal of Annex 31 is to advance the capability and reduce the cost of estimating the energy related environmental effects of buildings, and to increase awareness of the importance of including such estimation in the design process. The end product for the project will be a final Annex 31 report, web-site and CD-ROM available in early 2005. The project scope includes a description of tool theory and methods, a directory of tools, case studies, and research reports on how tools perform. The Annex 31 report may be of interest to users of tools, to groups engaged in tool design, and to anyone establishing policy and guidelines for promoting better decision-making within the building sector.

CMHC Project Officer : *Thomas Green*
CIDN : 16290300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MONITORING THE PERFORMANCE OF A HIGH-RISE RESIDENTIAL BUILDING RETROFIT: IMPACT ON ENERGY CONSUMPTION

In 1997, CMHC monitored the performance of a high-rise residential wall assembly that was retrofitted with an exterior insulated finish system. The monitoring showed that the retrofit enhanced the performance of the wall by increasing thermal insulation levels, reducing air leakage and preventing moisture penetration. The impact of the retrofit work on energy consumption was also studied. The study found that the building was a high energy user (in excess of 550 ekWh/m2) prior to the retrofit. The retrofit work resulted in energy savings of $18,720 per year. Energy savings were not as high as expected but it is suspected that this was due to the installation of a parking garage heating system and a new corridor air ventilation system. However, the post construction building energy use was reduced to 216 ekWh/m2. It was found that the energy savings associated with the added wall insulation provided an overly long payback given the incremental costs of the insulation system. The report was published as an energy efficiency case study in July 2004.

CMHC Project Officer : *Duncan Hill*
CIDN : 16020200
Division : Policy and Research Division
STATUS : Completed
AVAILABILITY : Product is available on the Internet

MULTI-UNIT RESIDENTIAL BUILDING ENVELOPES DESIGNED FOR RENEWABLE ENERGY: HALIFAX, NOVA SCOTIA

Passive solar energy collection, solar control, and natural ventilation techniques have been used to heat, cool and light buildings from prehistoric times. Many of these techniques consciously crafted building envelopes to control heat and light between dwelling units and the outdoors. However, most designers of modern multi-unit residential buildings (MURBs) have largely overlooked these opportunities for a variety of reasons.

Increasing fossil fuel costs and more sophisticated engineering analysis tools such as network airflow analysis and computational fluid dynamics software have encouraged the design of renewable energy approaches. However, there is still a widespread perception in the Canadian design industry that renewable energy technologies are inherently expensive.

The report looks at various renewable energy approaches for MURBs: passive space heating, semi passive space heating, passive cooling, semi passive cooling, passive ventilation, daylighting and solar domestic water heating and focuses on a recently constructed project in Halifax, Nova Scotia.

An integrated design process (IDP) was used in formulating the design. An IDP is an approach that brings together all of the parties that influence the design of a building as well as those that use the building at the very early stages of the design process. The goal of an IDP is to arrive at optimal building performance solutions while keeping costs within budgetary constraints.

The report describes typical MURB constructions currently in use in the Maritimes, energy costs and modeling, climatic factors, energy efficiency performance indicators, building form issues, estimated system costs and energy savings costs by employing renewable energy measures. An industry survey of building industry professionals in the Halifax area was carried out in order to estimate the existing utilization of energy related technologies in MURBs as well as the interest in the future use of these technologies. The authors conclude with a list of recommendations regarding the informational requirements of builders of MURBs with respect to renewable energy.

Prepared by Chris Mattock and Ian Theaker, Habitat Design + Consulting and Integral Design / Engineering. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2004. 85 pages

STATUS : New Completed Report

AVAILABILITY : On a loan basis from Canadian Housing Information Centre

OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating appliance, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC undertook research into distribution system upgrades. The first stage of this work was a review of the performance characteristics of current and innovative distribution systems. The review established the operating characteristics of HVAC equipment and distribution systems, and the limitations of retrofitting existing heating systems. Three small projects evolved from the preliminary review. Contractors looked at simplified furnace sizing calculations, the difference in heating system installation between a city with diligent inspection and one where inspection is minimal, and a demonstration of how to install forced air ducting in houses with no existing air distribution systems. The retrofit furnace sizing project showed that furnaces can be sized quite accurately using billing data. The project is complete and published, and the sizing procedure is described in a Research Highlight and an About Your House document. The report on the effects of municipal requirements on HVAC system design was less conclusive. A relatively small sample size and a similar lack of inspection in both municipalities prevented the study from showing a clear advantage of municipal requirements and enforcement. The report has been published and a Research Highlight was issued in fall 2003. The third study on retrofitting ducting in existing houses was published in the summer of 2004. As has been found in other recent research, ducting is rarely installed according to designs and the actual flows do not meet design flows in many cases. Duct leakage, even with some attempts at sealing, is significant. Inspection is rudimentary. Despite this variance from design, homeowners are usually satisfied with the quality of the air circulation.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is available

CIDN : 24400200

STATUS : Completed

SHORT CONSUMER PIECES ON ENERGY SAVINGS IN SPECIFIC HOUSING STYLES

This research produced a series of short consumer information pieces describing options for improving the energy savings in older houses, targeted at specific house design types. CMHC has three longer publications available or pending that are specific to a single house type. This CMHC PERD (Program for Energy Research and Development) initiative will provide the same design-based advice to renovators and homeowners, but in a shorter format, with the most effective energy retrofits prioritized for each housing style. The final reports have been submitted to CMHC and are being prepared for publication. Final products are expected in late 2004.

CMHC Project Officer : *Don Fugler*

CIDN : 25420200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SMALL-SCALE RENEWABLE ENERGY SYSTEMS, GRID-CONNECTION AND NET METERING: AN OVERVIEW OF THE CANADIAN EXPERIENCE IN 2003

This report documents the experience of small-scale grid-connected renewable energy power producers in Canada and provides an overview of the grid-connect and net metering policies of electric utilities across the country as of March 2003. It also provides background and resources for those who are interested in establishing their own grid-connected systems. For the purposes of this study, renewable energy systems were defined as: Photovoltaics (PV), Building Integrated Photovoltaics (BIPV), Wind and Microhydro. Also, hybrid systems (any combination of the latter four) were included. The system sizes were limited to what a homeowner or a small to medium size commercial venture might install cost-effectively.

Prepared by Shawna Henderson and Jeff Bell, Abri Sustainable Design & Consulting. CMHC Project Officer: Christopher Ives.. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 125 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR_Renewable_Energy_EN(w).pdf

STRATEGIES FOR ALTERNATIVE ENERGY USE AND REDISTRIBUTION AT THE BUILDING ENVELOPE

As part of a three year PERD initiative, integrated consultant teams explored the potential strategies to reduce, generate or recover and redistribute energy at the building envelope of multi-unit residential buildings for Prairie, Vancouver, Toronto and Halifax locations. The teams include expertise in building management, and development, as well as architectural, engineering and energy simulation. Each team developed recommendations for the strategies most feasible in their study areas. In Montreal a charrette led by NRCan explored sustainable strategies for a mixed-use project which includes retrofit and new commercial and residential development. The findings of the Prairie team have been used to develop strategies for a housing development in Regina. A compendium of the strategies, representing analysis of building envelope-related energy strategies for Halifax, Toronto, Calgary, and Vancouver is under development. Expected date of completion is December 2004.

CMHC Project Officer : *Sandra Marshall*

CIDN : 08400306

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

STRATEGIES FOR REDUCING BUILDING ENERGY USE VIA INNOVATIVE BUILDING ENVELOPE TECHNOLOGIES: FINAL REPORT

A research project was undertaken to evaluate the opportunities to reduce, recover and generate energy at the building envelope in existing multi-unit residential buildings. The research was conducted by a multi-disciplinary team of engineers, architects, building envelope consultants and representatives of the property management sector. The project reviewed new and emerging building envelope technologies that could help to reduce energy consumption in existing buildings, primarily based on experiences in European apartment buildings. Building integrated photovoltaics, solar water heating, solar air heating, insulation and window retrofits and double façade technologies were included in the review. For the most part, it was found that the current economics and risk associated with many of the available technologies can undermine the attractiveness of such technologies for property owners and managers. Two technologies (solar air heating and enclosing balconies) were found to offer attractive energy savings especially if the technologies are incorporated into a larger renovation project and the benefits derived from offsetting future repair costs are considered.

Prepared by Enermodal Engineering Limited in association with Halsall Associates Limited, Greenwin Property Management. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2003. 30 pages

Note: No. 04-110 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR%20Strategies%20FINAL(w).pdf

SUPPORT FOR IEA ANNEX 39: HIGH PERFORMANCE THERMAL INSULATION SYSTEMS

The International Energy Agency has launched an R&D program to research high performance thermal insulation systems for buildings. The project will focus on vacuum insulation panels that can achieve, in theory, an insulating value of R75 per inch. Vacuum panels represent an order of magnitude improvement over conventional insulating materials, thus the energy saving potential for both new and existing buildings is enormous. Plans are being developed to organize and run a demonstration project using vacuum panels in order to assess their application and performance in buildings. CMHC will be supporting Canada's contribution to the IEA project, led by NRC's Institute for Research in Construction, and will be able to disseminate the results to the housing industry. Canada has also been asked to participate in the development of an International Standard for Vacuum insulating panels as a part of the IEA effort. The project is currently underway and will be completed by January 2006.

CMHC Project Officer : *Duncan Hill*

CIDN : 30450200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

ENERGY CONSERVATION

UNDERSTANDING MULTI-RESIDENTIAL END-USE LOAD PROFILES

An external research program project is underway to study energy and water end-use load profiles in multi-unit residential buildings. The project will focus on the energy and water load profiles monitored in a number of multi-unit residential buildings and will develop analytical tools and methods that can be used to study the load profiles and determine whether or not opportunities exist to save energy and water given the specific patterns and magnitudes of consumption. The project will be completed by January 2005.

CMHC Project Officer : *Duncan Hill*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 26470218
STATUS : Ongoing

FIRES & FIRE PREVENTION

CANADIAN HOUSING FIRE STATISTICS

This report examines benchmarks and indicators related to Canadian housing fire losses, based primarily on statistics over the period 1980 to 1999. The high level statistical components used to establish fire risk in housing are fire incidence, fire deaths, fire injuries and fire damage. These four components are related to benchmarks, based on population, numbers of residential units and fire incidence. Statistics for both the Canadian population at large and First Nations are evaluated. Assessments are made based on residential unit type, ages of victims, urban-rural location, household size and crowding, household age and condition and ignition scenarios. Differences in fire risk between pre- and post-1980 residential units are identified. Recommendations for improvements in current fire data collection are suggested.

Prepared by Ken Richardson Fire Technologies Inc. in collaboration with Fuller Information. CMHC Project Officer: Mark Holzman. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Research Report). 98 pages

Note: No. 04-004 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Housing%20Fire%20FINAL(w).pdf

HEATING AND VENTILATION

ANALYSIS OF VENTILATION SYSTEM PERFORMANCE IN NEW ONTARIO HOUSES

Canada Mortgage and Housing Corporation (CMHC) has been interested in the development of residential ventilation standards and the integration of mechanical ventilation into Canadian building codes. Ontario's Building Code has a unique approach to mechanical ventilation, with the use of a bathroom exhaust fan to promote the required air exfiltration and a furnace fan to distribute the infiltrating air to all parts of the house. CMHC wanted to know if this simple system was proving effective for homeowners, so it commissioned a survey be conducted over a sample of 120 houses built after 1995 over three regions in Ontario.

The results show that exhaust-only ventilation systems (EOV) were installed in over 75% of the Ontario houses sampled. Heat recovery ventilators (HRV) were the next most frequent system. In houses with exhaust-only systems, most homeowners simply activated the exhaust fan, not knowing that the furnace fan was an integral part of an effective ventilation system. The report also describes other survey findings such as homeowner satisfaction with their ventilation systems, the frequency of window condensation, and seasonal window opening patterns.

Report: Ranya Sherif. Field Testing: Caroline Prochazka, Ranya Sherif, P. Christopher Timusk. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004. 24 pages

Note: No. 04-117 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/DC-20077853(w)-RR-Analysis.pdf

ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS

The objective of this External Research Program project was to determine the conditions under which exterior ground-buried ducts (earth tubes) could be used effectively. The work determined heat and moisture gains and losses for these systems under Canadian conditions. A draft final report has been received with conclusions: earth tubes do not appear to offer significant cost or performance advantages over heat and energy recovery ventilation systems, while introducing greater uncertainty in terms of performance and condensation control. The report concludes that heat and energy recovery ventilators would be the normally preferred approach to reducing ventilation energy use in Canadian housing.

CMHC Project Officer : *Chris Ives*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 24370213
STATUS : Ongoing

CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS

CMHC has been supporting the revision of Can/CSA F326-M91 (1998), Residential Mechanical Ventilation Systems, with a financial contribution for the Canadian Standards Association (CSA) to act as secretariat, through separate contracts to consultants researching various aspects of the standard, and through CMHC participation in the task group work of the Committee. Significant changes to the standard are likely. Technical review is in progress and the standard should be ready for balloting by late 2004 or early 2005.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 20620200
STATUS : Ongoing

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project was to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, monitored indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance was also assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, are used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings. A report and research highlight documenting the results of the project will be available by December 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 19340200
STATUS : Ongoing

CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two-pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption, and operational and maintenance issues over a one-year period. Recently, all of the heat pumps in the building have been converted to newer units with higher efficiency. The project will monitor energy consumption over the coming year to determine the annual energy savings associated with this upgrade. The project will be completed in November 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 18990200
STATUS : Ongoing

CONSERVATION CO-OP – CORRIDOR OVERHEATING REMEDIATION STUDY

The Conservation Co-op is an innovative multi-unit residential building that has adopted many advanced, or green, building practices in the design, construction and operation of the building. One of the features of the building is the use of passive cooling and solar shading to maintain comfortable summertime conditions in the building. Unfortunately, hot and humid conditions in the summer creates highly uncomfortable temperatures in the corridors and apartments of the building. Preliminary indications are that the heat recovery ventilation system for the building does not adequately ventilate the common spaces and may even contribute to overheating by delivering hot, humid outdoor air to the building. A project has been launched to assess the ability of a temperature and humidity controlled auxiliary cross ventilation system in the corridors to improve conditions. Similarly, the rooftop HRV systems that supply air to the corridors and apartments will be investigated to determine if the supply air function can be deactivated when outdoor air conditions are too hot and humid, and activated to take advantage of cooler outdoor conditions. The project will aid in the assessment of strategies to use night-time cooling to help maintain improved indoor conditions in multi-unit residential buildings without mechanical air-conditioning equipment. The project monitoring was conducted from the fall of 2003 through the summer of 2004 and reporting will be completed by December 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22710200
STATUS : Ongoing

DEMONSTRATION OF DUCT INSTALLATION IN HOUSES PREVIOUSLY WITHOUT DUCTING

Natural gas has recently become available in New Brunswick and other Maritime Provinces, and home owners are slowly beginning to convert from traditional fuels of electricity, oil and wood. Not only are these home owners considering a change in fuel, but the availability of new technology is prompting them to consider alternate heating distribution system types. This project involved working with a heating contractor in Fredericton, New Brunswick to monitor the installation of new forced air heating systems in three older houses previously without such systems. Air flows were measured, recorded and compared with design air flows and measured air capacity of the blower. A photographic record illustrates obstacles faced by the heating contractor, which can force deviation from original system design.

The objectives of this project were:

- To record those obstacles and challenges faced by heating contractors engaged to install forced air heating systems in housed previously without such systems;
- To evaluate the effect of such obstacles on the ability of the forced air system to deliver design air flows throughout the house;
- To illustrate the importance of detailed duct design in retrofit installation projects.

Prepared by R. Clarke Designs Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004. 31 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM

An innovative heat recovery ventilation system has been developed and installed in an apartment building. The system was based on the use of low wattage fans, heat recovery and a simple air distribution system to meet the ventilation needs of individual apartments. The system was evaluated in terms of airflow, heat recovery efficiency and noise. It was determined that the system was unable to induce outdoor air into the apartment, by the operation of the exhaust fan, without the inclusion of a supply air fan in the system. Once installed, the system appeared to be capable of meeting the ventilation requirements of the apartments where installed. A Research Highlight on the project was available in October 2004. A second project monitored the performance of an integrated fan-coil heat recovery ventilation system designed for individual apartments. The system was evaluated in terms of outdoor air and exhaust flow capability, susceptibility to indoor-outdoor pressure regimes and unbalanced in-suite exhaust, and energy use. The research determined that the integrated system worked well and offers a significant improvement over conventional approaches to ventilating apartments. Areas where the system could be improved were also identified. A report ("Field Testing of an Integrated Ventilation Space Conditioning System for Apartments") and research highlight are available.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is available

CIDN : 22710200
STATUS : Completed

FIELD TRIALS OF THE EKOCOMFORT PRODUCTS

CMHC, in partnership with NRCan, carried out a project to evaluate the performance of a new residential HVAC system that combines space heating, domestic hot water and ventilation into one integrated unit. These products, being produced under the eKOCOMFORT label, were developed by several independent Canadian manufacturers in partnership with NRCan. The detailed monitoring of the performance of each of the manufacturers eKOCOMFORT units was carried out in homes in different regions of the country to assist each manufacturer in refining their products. The project also assessed the ease or difficulty of installing and commissioning the units in a variety of residential situations, information designed to assist manufacturers to refine and improve product installation. In addition to fully monitored sites, audits were carried out on eKOCOMFORT units of each manufacturer to collect and evaluate homeowner/user data on maintenance, operating cost, noise levels and customer satisfaction. The field work for this project was completed in August 2004, with the project report to be available in the spring of 2005.

CMHC Project Officer : *William Semple*
CIDN : 27820200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL VENTILATION FOLLOW-UP PROJECTS (A-BASE)

This project covers two research studies. One study reviewed existing research on the air quality implications of different house ventilation rates, especially data from Canadian field testing. A short draft report on the findings was prepared and distributed to the CSA F326 Committee on Residential Mechanical Ventilation in 2003. The research found that there was a paucity of data on ventilation rates and health, and that ventilation requirements are often tied to odour sensitivity rather than issues such as respiratory health. The research findings are available from the project manager but will not be published as a CMHC report. The second project surveyed occupants of 100 new Ontario houses to determine whether the "exhaust-only" ventilation systems generally installed in new Ontario housing are satisfying the needs of the occupants. The results show that most Ontario homeowners with "exhaust-only" ventilation systems do not understand their use, do not use them frequently, and do not use them to mitigate air quality problems. A report and research highlight are available.

CMHC Project Officer : *Don Fugler*
CIDN : 28640200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

STUDY OF NECESSARY CHANGES TO HARMONIZE STANDARDS REQUIREMENTS RELATED TO COMBUSTION VENTING

In the recent review of ventilation codes and standards, it became clear that standards from different agencies use disparate means of assessing whether a house chimney or vent is at risk. A contractor examined the requirements from each standard and drafted appropriate code language to present to those committees. These changes were presented to the CSA F326 committee in January 2003. A task group presented the CSA F326 preferred protocol to the standards committees for the gas, oil, and wood industries through the spring and summer of 2003, in hopes of harmonizing the requirements for all these standards. The gas and oil standards committees have created task groups to study the harmonization proposals. The wood industries standard is in line with F326. Work will continue through 2004 and beyond.

CMHC Project Officer : *Don Fugler*
CIDN : 24920200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : There will be no product for this project

SURVEY OF IN-SUITE SPACE AND DOMESTIC HOT WATER HEATING SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

A project to survey the operation and maintenance performance of in-suite space and domestic hot water heating systems in multi-unit residential buildings has been completed. Previously, there has been little research conducted on the performance of in-suite systems as they are a relatively new approach to meet the space conditioning and water heating needs of apartment buildings. Nine buildings were surveyed to establish system type, annual operating and maintenance costs, capital costs, architectural considerations, owner and occupant satisfaction with system performance and other parameters. The project concluded that in-suite systems represent a viable alternative to central approaches and that residents and property managers are satisfied with their performance. However, operation and maintenance can be problematic for residents and the longterm performance of the systems is unknown. Interior space use, building envelope penetrations can also represent challenges. The project provides insight regarding how well in-suite space and domestic hot water systems meet the needs of building owners and occupants.

Prepared by Finn Projects (Synchronicity Projects Inc.). CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2003. 45 pages

Note: No. 04-107 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/FINISHEDSURVEY-WEB.pdf

TUNE-UP GUIDE FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A guide has been developed that compiles existing information on how on-site staff and contractors can improve, or fine tune, the performance of multi-unit residential buildings. Similar guidelines exist for commercial buildings but are referred to as re-commissioning guidelines. The guide will provide low cost and no cost methods to improve the performance of building envelope, space and domestic hot water heating, ventilation, health and safety, and electrical systems and appliances in multi-unit residential buildings. While the energy savings accrued are expected to be modest, use of the guide will ensure that buildings operate efficiently and performance problems are resolved before they become larger concerns. The Tune-Up guidelines will also allow a property owner or manager to establish optimal system conditions so that the impact of repairs, renovations, or energy and water efficiency improvements can be realistically evaluated. The Guide was completed in March 2003. A Research Highlight describing the Tune-Up Guidelines will be released by December 2004. CMHC field testing of the Guidelines in Toronto and Saskatoon which began in September 2003, will be completed in March 2005.

CMHC Project Officer : *Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 23590200

STATUS : Ongoing

BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document - a Best Practice Guide (BPG) - for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in CAD format, outline specifications and additional sources of information and references. A first draft of all chapters and details has been prepared. Publication is expected for spring 2005.

CMHC Project Officer : *Luis de Miguel* ***CIDN*** : 2216 0200001
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDES UPDATE

This project will revise, one at a time, the five existing Best Practice Guides, starting with Brick Veneer Steel Stud published five years ago. New research and user feedback from seminars based on the guides and from CMHC's web site indicate that some text and details need updating. Partnerships will be developed with interested parties for input, review and promotion. A national competition will be held to select a consultant for each guide who will be responsible for coordinating and producing the revision work. Each consultant will work with an advisory committee, specific to each guide, who will participate in drafting the new edition. The advisory committee will include practitioners, industry representatives, manufacturers and regulators. The work will include a thorough study of the existing Guide, an analysis of users' feedback, and roundtable critique sessions. Public sessions will be held to discuss the proposed revisions. The consultant will then collect the information, produce the revised manuscript and obtain consensus from the advisory committee. The revised Brick Veneer Steel Stud guide is currently being reviewed by the advisory committee.

CMHC Project Officer : *Barry Craig* ***CIDN*** : 23780200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BETTER BUILDINGS CASE STUDIES

This project documents and illustrates repairs and upgrades to multi-unit residential buildings across Canada. It is estimated that, in this country, $300 M are spent every year in premature building failures. CMHC is collecting and publishing easy to read case studies to present to owners, architects, builders and property managers on what can go wrong and why, how to fix it and how much it will cost. Most cases will focus on the building envelope since the vast majority of documented problems occur there, in addition to examples of energy and acoustical upgrades. This project adds to CMHC's current documentation and publication of case studies on repair and retrofit of multiple-unit residential buildings. Ultimately, a repair guide will be developed based on this work. Case studies from across Canada are obtained from those directly involved in the repairs and involve buildings of all types of construction ranging in height from 3 to 50 storeys. Every year the Corporation publishes 10 Better Buildings Case Studies on CMHC's website: http://cmhc.ca/en/imquaf/himu/bebufa_021.cfm. To date, 41 case studies have been published.

CMHC Project Officer : *Luis de Miguel* ***CIDN*** : N/A
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

BOILER PIPING STUDY

The purpose of this External Research Program study is to examine boiler plants with typical configurations in residential high-rise buildings, using fire-tube, water-tube, and atmospheric, copper-fin boilers in order to: determine if the conditions would be suitable for the replacement of the boilers with Mid Efficiency Fan Assisted (MEFA) boilers; study the application of motorized 3-way valves, specifically to determine their impact on flows and return water temperatures to the boilers; if conditions are not suitable, to determine what alterations would be required for the installation of MEFA boilers, and; prepare guidelines for engineers and designers for projects involving the replacement of large mass boilers with MEFA boilers. This information is not currently available and is essential for estimating the energy savings to be gained in the use of more energy efficient MEFA boilers. The research project has been completed with a report to be available late 2004.

CMHC Project Officer : *William Semple*

CIDN : 25250218

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY

CMHC, in partnership with the Homeowner Protection Office and Forintek Canada Corporation, provided the British Columbia Institute of Technology (BCIT) with a financial contribution to undertake and complete a study to assess and evaluate the feasibility of building, operating and maintaining a Building Envelope Test facility in which the response of wall assemblies to 'real-time' weather load, as experienced in the coastal climate of British Columbia, can be investigated and evaluated. The project is expected to be completed by the end of 2004.

CMHC Project Officer : *Silvio Plescia*

CIDN : 23840200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC initiated another project with the University of Ottawa to review the data available on condominiums within municipal files. The project revealed that the data exists within the local land registry office but was difficult to extract given the state of the individual files. Nevertheless, the University of Ottawa was able to characterize the population of condominiums in the greater Ottawa area in terms of number of buildings, number of units, number of storeys and age. A report and Research Highlight documenting the project findings are available: *"Characterizing the Condominium Population of the Greater Ottawa Area, 1969 - 2002"*. CMHC is currently repeating the project in Halifax, Nova Scotia, to determine whether or not similar opportunities to characterize the stock of condominiums exist elsewhere. This project will be completed by late 2004.

CMHC Project Officer : *Duncan Hill*

CIDN : 2277 0200001-2

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project carried out a condition survey of condominiums in the Greater Toronto Area. This project collected data on 209 townhouse and high-rise condominiums. It examined the relationship between condition and financial health for these properties as representative of the condo stock in the GTA. The data was analyzed and Condition and Funding Indices were developed which can be used as tools to aid owners and property managers. These indices are useful to benchmark the relative health of properties and to assist in the planning of repair work and reserve funding. The study will be summarized in a Research Highlight in late 2004.

CMHC Project Officer : *Sandra Marshall*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 21610200
STATUS : Ongoing

EVALUATION OF BUILDING CONDITION ASSESSMENTS REPORTS

This project will review building condition assessment reports of twenty-five high-rise (over eight storeys) residential buildings to illustrate general trends and formats in use. A building condition assessment is a review and comment on the present and anticipated condition and performance of a building's components. Various elements of the property can be included in the review (architectural, mechanical, electrical, civil, elevating devices, building envelopes, underground parking structures, recreational facilities and other specialty construction). Property managers report that the quality of the condition reports varies widely and there is no consensus on methodology for the assessment, cost allowances and sources of information on replacement costs and service life of many building elements. This creates financial problems when major items in a building have to be replaced and insufficient or no allowance was made to cover the expense. A sample of the reports will be analyzed in detail to ascertain the validity of the predictions, cost estimates, errors and omissions. A standard building condition assessment form will be developed and tested. Five firms will conduct a condition assessment on the same building using the proposed new form which will then be reviewed by interested stakeholders. Owners, managers, prospective owners and firms conducting audits will benefit from this analysis. The final report is expected in July 2005.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32260200
STATUS : Ongoing
NEW

EXTERIOR INSULATION AND FINISH SYSTEMS. BEST PRACTICE GUIDE BUILDING TECHNOLOGY

This guide covers the use of exterior insulation and finish systems (EIFS) in new construction, both high-rise and low-rise. EIFS are products that integrate insulation and a "stucco" like covering, for cladding exterior walls. This sixty-five page technical guide, and extensive appendices, is intended to assist building professionals in proper design and application of EIFS. Following these best practice recommendations promotes satisfactory performance and durability of the products. Includes a CD-ROM version of the guide.

Ottawa: Canada Mortgage and Housing Corporation, 2004.

Order number 63567 **Price: $89.00 + GST and handling charges

Nota : Aussi disponible en français sous le titre : Systèmes d'isolation des façades avec enduit

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

FIELD REVIEW OF INSULATION RETROFITS OF SOLID MASONRY STRUCTURES

This project will investigate the condition of solid masonry wall assemblies that have been retrofitted with interior insulation to reduce energy use and enhance occupant comfort. Site investigations will visually assess the condition of masonry structures and adjacent insulation and framing layers on the exterior and interior of the wall assemblies. This information is required as there is a general perception in the housing industry that the application of interior insulation to solid masonry wall assemblies will cause the walls to deteriorate due to changes in the heat, air and moisture regimes to which the walls are exposed. This work will result in a compilation of case studies of solid masonry insulation retrofit projects and the development of guidelines for assessing and insulating solid masonry buildings. The project will be completed by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30840200
STATUS : Ongoing

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings. The case study reports will be available by January 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

INNOVATIVE BUILDING CASE STUDIES

Innovative Buildings case studies document new projects of particular interest to architects and other building professionals. They showcase built projects which use new technologies, sustainable features and innovative planning attributes, among other notable features. As they are completed the studies are showcased on the CMHC website at http://www.cmhc-schl.gc.ca/en/imquaf/himu/buin_009.cfm. Quayside Village will describe the repairs required and the difficulties imposed on the owners of a leaky condo in North Vancouver. It will be showcased in the Better Buildings series at http://www.cmhc.ca/en/imquaf/himu/bebufa_021.cfm

CMHC Project Officer : *Sandra Marshall*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web
CIDN : 08400306
STATUS : Ongoing

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing. The results of the study will be published as a CMHC Research Highlight by January 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 22010200
STATUS : Ongoing

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hygIRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hygIRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry. The project will be completed in December 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

PERFORMANCE EVALUATION OF RETROFITTED SOLID MASONRY EXTERIOR WALLS

The purpose of this External Research Program project is to establish the relationships between the initial composition of the wall and the retrofit (particularly the insulating of previously uninsulated exterior walls) and the condition of the building envelope after it has been exposed to given indoor and outdoor loads for a given period of time. A sample of between 15 to 20 buildings located in the Montreal and surrounding areas is envisioned for the study. Various solid masonry wall compositions, building ages, renovation dates and retrofit solutions will be examined. The documented information will include: operating conditions, reports of water infiltration or condensation, and the overall visual condition of the wall. Calculations to determine the condensation potential of the wall systems will be performed using a simple, recognized, steady state one-dimensional model. The buildings will be grouped by categories, with the collected data presented in table form. A photographic record of each building will be carried out. The survey and analysis of the field performance data will give practitioners a knowledge bank on the performance of solid masonry wall buildings that does not presently exist. The project is scheduled for completion by June 2004, with a report available in late 2004.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25250217
STATUS : Ongoing

PERFORMANCE MONITORING OF A BRICK VENEER/STEEL STUD WALL SYSTEM: PHASE 5 RESULTS

The brick veneer/steel stud (BV/SS) wall system has become very popular over the last 20 years, however, the rapid adoption of this wall system has preceded the development of adequate design and construction standards. In order to address concerns about the long term safety, serviceability and durability of BV/SS wall systems, Canada Mortgage and Housing Corporation (CMHC) has undertaken a program to evaluate this popular wall system.

A relatively new system, called the Dynamic Buffer Zone (DBZ), has been developed which injects warm, dry air into the space between the exterior masonry and interior walls. The intent of this system is to keep moisture out of the masonry system to reduce the detrimental effects of condensation and freeze-thaw cycles.

As part of the CMHC evaluation program, Keller Engineering Associates Inc. (KEA) carried out in-situ performance monitoring of a BV/SS wall system. The performance monitoring focused on building science issues such as temperature gradients, moisture movements and pressure differences across the wall system. This report evaluates the practical efficacy of the DBZ system in a BV/SS wall system.

The performance of a test wall was monitored using various temperature, moisture and air pressure sensors that were connected to an automatic data logging system. The results of this study indicate that the installation of a DBZ is beneficial to the performance of the BV/SS system during winter months. Moisture vapour from the interior of the building is prevented from entering the wall system. However, a DBZ system may lead to distress over the long term since moisture from precipitation still enters the wall system, and once behind the brick veneer cannot readily escape.

Prepared by Keller Engineering Associates Inc. CMHC Project Officer: Luis de Miguel. Ottawa: Canada Mortgage and Housing Corporation, 2003. 117 pages

STATUS : New Completed Report

AVAILABILITY : On a loan basis only from Canadian Housing Information Centre

RAIN PENETRATION CONTROL WORKSHOP

Water penetration is a very frequent, recurring problem for building owners, leading to damage of building components, interior finishes and building contents. It frequently leads to high repair costs and possible litigation. Over the past few years, research undertaken by CMHC, has contributed to the understanding and the prevention of rain penetration. In particular the pressure-equalized rainscreen has been applied and refined. In this highly interactive workshop, the causes of rain penetration will be examined. The results of CMHC research will be presented, along with design features and practical details, which will help prevent rain penetration in a variety of wall types. This full day workshop is targeted to architects, engineers, specifiers, builders, developers and building owners concerned about rain penetration and how to prevent it. The workshop was presented in Toronto, Winnipeg, Edmonton, Montreal and Vancouver. No presentations are planned in the near future. This workshop was developed in cooperation with the Canadian Masonry Association, the Canadian Precast Concrete Institute and the Exterior Insulated Finish Systems (EIFS) and curtain wall manufacturers.

CMHC Project Officer : *Luis de Miguel*

Division : Policy and Research Division

AVAILABILITY : Seminar/training is available

CIDN : 08380303

STATUS : Ongoing

REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide, published five years ago. New research and user feedback from seminars based on the guide and from CMHC's web site indicate that some details need updating. Partnerships have been developed with interested parties for input, review and promotion. A national competition was held to select the consultant responsible for co-ordinating and producing the revision work. The consultant, Jim Posey, is working with an advisory committee, specific to the BVSS guide, which participates in drafting the new edition. The advisory committee includes practitioners, industry representatives, manufacturers and regulators. The work has commenced with a thorough study of the existing Brick Veneer Steel Stud Guide, including an analysis of users' feedback, followed by roundtable critique sessions. Public sessions were held to discuss the proposed revisions. The consultant then collected the information, produced the revised manuscript and is now in the process of obtaining consensus from the advisory committee. CMHC has proposed revisions to several details that are being sent to the advisory committee and the consultant for their comments.

CMHC Project Officer : *Barry Craig* **CIDN** : 23780200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

SUITABLE ACOUSTIC AND FIRESTOP TECHNOLOGIES

The objective of this research is to develop a best practice guide containing technical solutions for noise control and fire prevention that have been validated by a systematic review process. Although fire resistance and sound transmission ratings are available for a broad range of generic wall and floor assemblies, the building industry needs recognized solutions to ensure satisfactory performance in complete buildings. Accepted practice in one jurisdiction may be unacceptable in neighbouring provinces, or even in other cities in the same province. Designers, plan reviewers, builders, and inspectors, will benefit from a credible and broadly accepted set of solutions for appropriate sound and fire control with firestopping. Designs will be approved by a steering committee including partners from NRC, municipal governments and industry, and advisors from US and Canadian standards agencies. The guide will include details of firestops at service penetrations, barriers to restrict fire spread in concealed spaces, control of noise from plumbing and acoustic leaks at service penetrations. The project will be completed in 2005.

CMHC Project Officer : *Barry Craig* **CIDN** : 32190200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

SUPPORT FOR THE 10TH BUILDING SCIENCE AND TECHNOLOGY CONFERENCE, OTTAWA, MAY 2005

In recognition of the role that the Canadian Conferences on Building Science and Technology have played in the dissemination of technical housing research, the promotion of sharing and discussion of knowledge and experiences by the building science community and the importance of a Canadian forum for building science issues, CMHC will be joining the Institute for Research in Construction of the National Research Council, Natural Resources Canada and other public and private sector agencies as a major sponsor of the 10th Canadian Conference on Building Science and Technology, Ottawa, Ontario, May 12-13, 2005.

CMHC Project Officer : *Duncan Hill* **CIDN** : 32230200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

SUSTAINABLE BEST PRACTICE DETAILS

This project will produce a short, general guide to sustainability in residential construction that would apply as a companion piece to all CMHC Best Practice Guides. Existing details in the Brick Veneer Steel Stud Best Practice Guide will be examined and alternative details will be drawn. The new details will introduce concepts of sustainability and green materials to promote a healthier and durable environment. An important part of this project will be a method to compare alternatives when selecting materials. This Guide will assist architects and designers to resolve durability and sustainable design issues. The final report is expected in February 2005. The Guide should be available in October 2005.

CMHC Project Officer : *Luis de Miguel* — ***CIDN*** : 30480200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

WORKSHOP ON WOOD CONSTRUCTION DETAILING

This project resulted in a one-day workshop on wood-frame detailing for new buildings, addressed to architects, engineers and designers, with a focus on durability, buildability, acoustic performance and fire safety, based on various CMHC publications. The workshop is modelled after others CMHC has presented across Canada. After a brief introduction on Building Science, participants are presented with actual construction details which they analyze for air barrier and thermal continuity, condensation and rain penetration control. Subsequently, they re-design the details to optimize performance. The afternoon session deals with fire and sound issues in a similar manner. Registration is limited to 52 participants who work individually and in groups of 13. The workshop was presented in Toronto and Ottawa. The workshop has been recently held in Edmonton and Calgary in collaboration with the Alberta Building Envelope Council. Other dates, venues and registration information for the workshop may be found on CMHC's Calendar page:http://www.cmhc.gc.ca/en/evca/

CMHC Project Officer : *Luis de Miguel* — ***CIDN*** : 25340200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Seminar/training is available

HOUSE CONSTRUCTION

BUILDING CANADA: PHASE I FINAL REPORT

The purpose of this project was to examine the feasibility of developing a Building Canada program similar to the Building America model. To be effective, the Canadian program had to be of interest to Canadian builders and recognize the different environment by responding to their real needs, i.e., reducing construction costs, customer callbacks, warranty claims, construction time, and construction waste, while at the same time improving the energy efficiency of their new houses. There should be little or no additional cost for the builder and where ever possible a reduction in costs. This study was a necessary first step to determine if a Building Canada program was viable and could be established in Canada. It drew from the experience of the Building America program as well as the results achieved in a pilot with large Canadian builders. This project was managed by EnerQuality Corporation on behalf of a consortium of partners including: CMHC, Enbridge Consumers Gas, Union Gas, Owens Corning, and Natural Resources Canada. Building Canada was deemed a success for large builders and is presently going to be expanded to other areas of Canada.

Prepared by EnerQuality Corporation. CMHC Project Manager: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2003. 122 pages

Note: No. 04-115 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/FINISHEDBC-WEB.pdf

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION - UPDATE

The purpose of this project was to update CMHC's Canadian Wood-Frame House Construction guide to reflect the changes which are to be made to the 2005 edition of the National Building Code of Canada. The CWFHC content was updated to incorporate results from current research and improved housing construction techniques. Proposed changes to the NBC include changes in requirements for stairs, protection from precipitation ingress, carbon monoxide detection, and means of egress from basements. As a result of recent research, additional information was incorporated such as information on proper window installation and site-built roof trusses. The research component is complete which resulted in new content, sixteen new illustrations, and eighty-five updated/improved illustrations. The updated version is expected to be released in mid 2005, at the same time as the 2005 NBC.

CMHC Project Officer : *Joe Cottitto* — **CIDN** : 26990200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION TECHNIQUES AND PRACTICES FOR APPLICATION IN OTHER CLIMATES

The purpose of this research project was to demonstrate how to adapt Canadian wood-frame house construction techniques and practices in other countries with different climates. The resulting research report entitled Durable Wood-frame Construction for All Climatic Zones: A Companion to Canadian Wood-Frame House Construction" is divided into three parts. The first part covers well-established building science principles for building envelope durability. The second part breaks new ground in the development of a series of methods that allows a designer or builder to select a particular wall construction based on local site conditions and climatic data drawn from a NASA weather data base maintained on the world wide web. The third part provides examples of durable wood-frame building assemblies for all climate zones found around the world. The report focuses on the durability of the building envelope, and covers other related aspects of construction (e.g. ventilation and termites). The research is complete and the final report is expected by the end of 2004.

CMHC Project Officer : *Joe Cottitto* — **CIDN** : 27290200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Research Highlight is available

CASE STUDY OF CARMA CENTRE FOR EXCELLENCE

This case study examined the goals, strategies and activities of the Carma Centre for Excellence in Home Building and Land Development which was established by the residential building industry to address issues relating to the ongoing development and maintenance of a skilled housing construction and sales work force in Calgary. The study is completed with a report available late fall of 2004.

CMHC Project Officer : *William Semple* — **CIDN** : 28160200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC supported this Alberta Housing Industry Technical Committee (AHITC) research project. The research used laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they were to perform similarly, building code changes may be recommended. The laboratory work was not conclusive but two coat stucco did not show the same strength as the code-required three coat. Field tests in Calgary and Edmonton houses showed that both two coat and three coat stucco on new houses were having problems with cracking and serviceability, and that improvements should be made to installation practice. There was an inadequate sample of three-coat stucco houses in the survey to allow a statistically valid comparison between the failure rate of two and three-coat stucco. The field work is complete. A Research Highlight will be issued in late 2004.

CMHC Project Officer : Don Fugler
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPING AN INTRODUCTORY COURSE ON WOOD-FRAME HOUSE CONSTRUCTION

The objective of this multipartnered project, which is being led by the Homeowner Protection Office, is to develop an introductory course on wood-frame house construction for the owner-builders and small contractors with limited experience in the construction of single detached housing. The course will cover topics such as better building practices, building code, and other regulatory requirements involved in house construction. The course will be designed in three hour modules for delivery in the evening. Partners include the Homeowner Protection Office, the Canadian Home Builders Association of B.C., the Building Officials Association of B.C. and CMHC. The work is underway and the material will be developed and piloted in B.C. by Spring 2005.

CMHC Project Officer : *Joe Cottitto*
CIDN : 28820200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF HIGH PERFORMANCE STUCCO FOR DURABLE HOUSING CONSTRUCTION

The objective of this research project is to investigate the opportunities to engineer a Portland cement stucco material that will limit liquid water entry on its external surface while at the same time allow water vapour to diffuse (dry) out of it. This research project considers stucco as a material component of an ideal wall system; it does not look into system performance. The effects of possible imperfections, which may occur due to prevalent construction practices, present in the wall system are beyond the scope of this investigation. CMHC undertakes this work in partnership with the National Research Council of Canada, Institute for Research in Construction (NRCC/IRC). The project is expected to be completed by the end of 2005.

CMHC Project Officer : *Silvio Plescia*
CIDN : 27100200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

INSTALLATION GUIDE FOR RESIDENTIAL WOOD I-JOIST FLOOR SYSTEMS: A GUIDE TO HELP BUILDERS USE WOOD I-JOISTS SAFELY AND EFFECTIVELY

Wood-I-joists have become a common material for framing residential floors. While these products have been available for many years, they are new to some builders. Canada Mortgage and Housing Corporation and the Canadian Home Builders' Association have commissioned the development of this Guide to help builders use wood I-joists safely and effectively.

The Guide presents information that is common to all wood I-joist manufacturers. It is intended to help builders understand basics and to supplement the excellent technical literature and expertise provided by I-joist manufacturers.

Wood I-joists are proprietary products. This means the design values are not standard and the capabilities of I-joists (spans, loads, etc.) and some installation details (nailing patterns, etc.) vary from one manufacturer to another. Good installation and the resulting good performance of a wood I-joist floor system can be provided by understanding and implementing these key basic requirements: storage and handling; installation; span charts; holes in wood I-joists; bearing length; offset walls; rim framing; squash blocks and blocking; web stiffeners.

In addition, the Guide provides information about other topics that will concern builders from time to time including: floor performance, fire safety, and cantilevers.

Prepared by J.F. Burrows Consulting and Accurate Design and Communications Inc. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2004. 34 pages

Order number: 63559 **Price: $10.95 + GST and handling charges

Nota : Aussi disponible en français sous le titre : Guide de pose des solives de bois en I pour les bâtiments résidentiels

Note: No. 04-113 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight
AVAILABILITY : CMHC Information Products

SEISMIC UPGRADES TO LOW-RISE HOUSING

Design and construction practices have indirectly resulted in a progressive decline in the earthquake (seismic) performance of a majority of residential wood-frame buildings of more than one storey in height. With funding provided by CMHC, this work will identify practical, cost-effective changes in current residential wood-frame construction, and retrofit design and practice that will substantially reduce vulnerability to damage during strong earthquake events. Results from this research are expected by the fall of 2004. This research project proposes to formulate practical applications for the research results of the industry-leading multi-year research project referred to as the Earthquake 99 Project, a collaborative effort between TBG Seismic Consultants Ltd. and the Department of Civil Engineering at the University of British Columbia. The objective of this project is to formulate options for improving the earthquake preparedness of residential wood frame housing in British Columbia. Both new and existing single family and multi-unit wood frame construction will be investigated. To set the context for the examination of improvements in earthquake preparedness through seismic upgrading, this project will first examine the different types of housing construction commonly found in British Columbia. Design earthquakes and soil amplification for the south-west corner of the province will be examined as a precursor to the detailed evaluation of the earthquake damage potential for the range of housing types. This project is expected to be completed by end of 2004.

CMHC Project Officer : Silvio Plescia
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25380200
STATUS : Ongoing

HOUSE CONSTRUCTION

SEMINAR ON THE PROPER INSTALLATION OF WOOD I-JOISTS

This project will develop training material, e.g. trainers manual and visual aids, validated through a pilot, for a one day seminar on the proper installation of wood I-joist floor systems. Most of the material will be based on the "Installation Guide for Residential Wood I-Joist Floor Systems" but it will be expanded to cover the actual installation process. The guide, and its accompanying pocket guide, will serve as the participants' handout and resource material. The seminar will be delivered by the APA The Engineered Wood Association. Other delivery means may be explored as well. The seminar will be targeted to builders, renovators and building officials and the affected trades who work with wood I-joists. The seminar will be ready for delivery by summer 2005.

CMHC Project Officer : *Joe Cottitto* — ***CIDN*** : 32220200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Seminar/training is not yet available ***NEW***

UPDATE OF ROOF TRUSS DESIGNS WITH NAILING SCHEDULES

The purpose of this project was to research standard, simple roof truss designs (Fink W) covering a limited range of loading conditions and spans. The research report includes illustrations and tables providing details on the top and bottom chords, webs, plywood gusset plates and nailing patterns. This information will be useful, especially in certain atypical circumstances, such as remote locations where manufactured trusses are not available, as an alternative to engineered roof trusses or conventionally framed roof systems. The information from this research will be incorporated into the 2005 edition of the Canadian Wood-Frame House Construction publication and CD ROM.

Prepared by Oaktree Engineering Ltd. CMHC Project Officer: Joe Cottitto. Ottawa: Canada Mortgage and Housing Corporation, 2004. 28 pages

Note: No. 04-126 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

HOUSE CONSTRUCTION INDUSTRY

CARMA CENTRE RESIDENTIAL CONSTRUCTION TRADES TRAINING: JOB FUNCTION AND CURRICULUM VALIDATION

This project will address a component of an overall project entitled "Career Pathways in Professional Homebuilding". The objectives of this project will be to complete validation of 100 occupations and develop potential career ladder and pathways and counselling documents to be used by students and adults, counsellors and educators. The research is necessary to evaluate job functions of all the major occupations and to determine the skills and technologies used to perform each job function. This job function information will be evaluated against existing curriculum in both the high schools and post secondary institutions. This process will assist in updating and re-writing curriculum to match industry practices and worker needs. The project will be completed in autumn of 2004 with a report available early in 2005.

CMHC Project Officer : *William Semple* — ***CIDN*** : 28810200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

COMPARISON AND ANALYSIS OF PROVINCIAL BUILDER AND RENOVATOR INDUSTRY PROGRAMS: FINAL REPORT

The purpose of this research project was to investigate the current situation of the provincial builder and renovator training/certification programs in Canada and in other countries, and to conduct a comparative analysis of the programs.

Training/certification programs for builders and renovators have been developed for most regions/provinces in Canada. Each believes, to some degree, that they are unique and thus require regional customization. It is not known how these programs compare to one another and to the National Occupational Analysis for New Home Builder and Residential Renovation Contractor (OA). There is a need to clearly identify the underlying rationale for why and how training programs, delivery, and management systems were developed and implemented.

The objectives of this study were:

1. To analyze the existing programs and compare the individual elements of the required training courses using the tasks and subtasks of the existing National Occupational Analysis for New Home Builder and Residential Renovation Contractor as the reference point.
2. To identify training gaps in the awareness, knowledge acquisition and skill development elements of the courses through comparison to the awareness, knowledge acquisition and skill development elements of the Occupational Analysis.
3. To identify the operational differences and commonalities of the training/certification programs across the country by comparing the delivery processes and management of the programs.
4. To compare training/certification programs in other countries, which have implemented similar industry programs, with those in Canada.
5. To propose a harmonized pan-Canadian model for builders and renovators.

The research involved a series of steps: collection of course materials for analysis; development of a standard course analysis matrix; analysis of course materials; assembly and summary of program requirements/delivery process information; development of a pan-Canadian model; validation of the pan-Canadian model in British Columbia; and presentation of the results at the National Education and Training Advisory Committee.

Prepared by Sun Ridge Group. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2004. ca 218 pages

Note: No. 04-122 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/FINAL%20WEB2.pdf

TRAIN THE TRAINERS WORKSHOP - PILOT

This project will develop, organize and deliver a three day national train the trainers' session so new builder and renovator members, First Nations technical service providers, and private home inspectors can become trainers for their jurisdiction and membership. The training session will be based on the delivery of existing CMHC material but will also be of benefit for new training material. There will be approximately twenty-four new trainers, who will be selected by each of the four sectors as identified above, invited to participate in this event. This work has been contracted.

CMHC Project Officer *: Joe Cottitto* ***CIDN*** : 32200200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project ***NEW***

NOTE: See also p. 86-88

HOUSING RESEARCH

CONTRIBUTION TO RESEARCH PROJECTS AT THE CANADIAN CENTRE FOR HOUSING TECHNOLOGY

In co-operation with NRC and NRCan, this project is to support research projects to evaluate energy efficiency technologies, and data analysis of house performance at the Canadian Centre for Housing Technologies (CCHT). Some of the projects to be undertaken include the evaluation of a residential fuel cell, and strategies to reduce residential summer cooling loads. Several other projects will be determined by the CCHT's Research Committee which represents the three partners, Canada Mortgage and Housing Corporation, Natural Resources Canada and the National Research Council of Canada.

CMHC Project Officer : *Ken Ruest* — ***CIDN*** : 32090200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

NOTE: See also p. 103

INDOOR ENVIRONMENT

COMBUSTION APPLIANCE VENTING LIMITS: LAB TESTING AND STANDARD DEVELOPMENT

This project will quantify spillage levels of different gas (and perhaps oil) appliances under high levels of depressurization. In parallel, test methods will be developed and recommended to the appliance standards so that depressurization testing can be integrated into their certification testing. This work follows from a recent CMHC survey of in-use appliance spillage. If successful the testing will quantify the amount of combustion spillage of appliances under depressurization and help to assess the health implications of that spillage. Depressurization test methods will be developed for standards agencies. The laboratory work will be undertaken in conjunction with Natural Resources Canada and completed by mid 2006. The procedure will be forwarded to the gas appliance standards agencies, and may perhaps be applicable for oil appliance standards as well.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 32130200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

COMPREHENSIVE PARTICULATE REDUCTION FOR HOUSE OCCUPANTS WITH RESPIRATORY PROBLEMS

High levels of airborne particulates are associated with decreased lung function and increases in hospital visits and mortality, particularly in those people with pre-existing respiratory problems (e.g. asthma). Many recommendations by health professionals stress actions to reduce the amount of indoor particulate. This study will quantify the amount of indoor particulate in a small sample of houses and will test the success of measures to reduce indoor particulate concentrations. The contractor experienced difficulties in locating suitable sample houses, but expects to have completed summer and winter field testing of five dwellings by mid-2005.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 30490200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

DEPRESSURIZATION RESISTANCE TESTING

There are two projects under this title. One project is supporting the development of testing procedures to be used in wood burning appliance standards to determine the depressurization resistance of various appliances. The lab testing procedure appears to be more complicated than originally envisioned. The test protocol had difficulty dealing with appliances (such as woodstoves) that had a variable output and a cycle measured in hours. It may be appropriate for appliances with more consistent performance, such as pellet stoves or fossil fuel fired appliances. A report is being prepared. Another project surveyed 100 appliances in Peterborough to see if theoretically "spillage-resistant" appliances can operate under significant house depressurization. Many of the spillage-resistant appliances can operate safely at up to 50 Pa of negative pressure, but there are examples in every class of product which spill despite their apparent "spillage resistance". A Research Highlight has been produced (04-121 in the Research Highlights Technical Series). The project results are part of the justification for the new laboratory test project on the pressure limits of spillage resistant appliances.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 24920200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Research Highlight is available	

ENVIRONMENTAL CHAMBER TESTING OF EMISSIONS FROM NON-CCA TREATED WOOD

CCA or copper chromated arsenate, the most widely used wood preservative in the past is being phased out. A number of other products are being used to replace CCA. This External Research Program project will determine and measure the chemical emissions of wood treated with these new preservatives.

CMHC Project Officer : *Virginia R Salares*	***CIDN*** : 28370211
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

FEASIBILITY STUDY FOR INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT

CMHC made a contribution to a feasibility study investigating the relationship between indoor air quality and severe respiratory tract infections in Inuit infants in Baffin region, Nunavut. The work was carried out in conjunction with the Children's Hospital of Eastern Ontario, Health Canada, Natural Resources Canada, the Nunavut government and Nunavut health and housing agencies. Testing took place over the winter of 2003 in 20 houses in Cape Dorset, including air quality measurements, blower door testing, and long term air change rate measurement. These results show that some of the houses are under ventilated, but that air quality is similar in many aspects to more southern housing. There is a proposed project with the partners to explore ventilation solutions in Nunavut communities in 2005. The planned first step will be to conduct a wider survey of air change rates and occupancy factors in a variety of Nunavut communities, to see if the Cape Dorset results are typical.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 27570200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

GARAGE PERFORMANCE TESTING: FINAL REPORT

The focus of this study was to:

1) Establish the range and profile of airtightness in the garage-to-house interfaces in regions across Canada.

2) Determine the implications of garage-to-house air leakage on house indoor air quality.

3) Propose and test solutions for reducing contaminant transfer between garages and houses.

Forty-two houses with attached garages were tested to assess the leakage characteristics of the house to garage interface. On average 10 to 13% of house leakage occurs through the interface. Based on CONTAM modelling using a cold start and a hot soak test, it was found that ten of the 42 houses had elevated pollutant levels indoors resulting from garage-to house air leakage.

Three remediation strategies were tested and modelled, including

1. Tightening the garage-to-house interface,
2. Installation of a passive air grille from the garage to the exterior, and
3. Installation of an exhaust fan in the garage.

All strategies were found to reduce peak concentrations of pollutants in the house.

Prepared by Sheltair Group Resource Consultants Inc. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004. 47 pages

Note: No. 04-108 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Garage-web.pdf

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar or the Build and Renovate to Avoid Mold workshop for housing and health professionals. A second day consisting of a site visit to a home with an IAQ expert demonstrates the IAQ investigation method. Qualified individuals can proceed to the CMHC Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact Virginia Salares (e-mail vsalares@cmhc.ca, tel 613 748-2032, fax 613 748-2402), the training coordinator (e-mail: iaq22qai@magma.ca, telephone 819 827-3915) for admission requirements and application forms. Thirty individuals have received their completion diploma and fifty are in the field training phase. For referral purposes, a list of diploma graduates is available from CMHC offices.

CMHC Project Officer : *Virginia R Salares*

Division : Policy and Research Division

AVAILABILITY : Seminar/training is available

CIDN : 16230300

STATUS : Ongoing

PEI STUDY: HOUSING CONDITIONS, BIOLOGICAL EXPOSURE AND CORRELATIONS TO HEALTH OF BABIES IN PEI

This project, funded by Health Canada, consists of repeating the air quality tests in some houses from the PEI study called: Housing Conditions, Biological Exposure and Correlations to Health of Babies in PEI. The purpose of the project is to verify if the exposure conditions measured at the beginning of the babies' health monitoring is representative of the exposure during the full two years of the health monitoring. In the fourth year of the study, 33 houses had repeat testing performed--floor dust sampling only. During the fifth year of the study, the complete testing protocol was repeated in 6 houses. During the winter of 2002/2003, 10 additional houses have been retested. No further retesting is planned and the babies health monitoring is to continue until spring 2005. Data analysis is underway.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 16180300

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study is ongoing and expected to be completed in 2004.

CMHC Project Officer : *Virginia R Salares* ***CIDN*** : 2157 020001

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

CMHC Project Officer : *Virginia R Salares* ***CIDN*** : N/A

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

INDOOR ENVIRONMENT

RESIDENTIAL MARIJUANA GROWING OPERATIONS AND CLANDESTINE NARCOTICS LABORATORIES - HEALTH AND SAFETY ISSUES FOR CONSUMERS AND IMPLICATIONS FOR CMHC

Working with the RCMP and the CAS in this study, CMHC will document the extent of damage and contamination due to mold or chemicals in six houses that have been used for growing marijuana or producing narcotics. The houses will be investigated using the CMHC Indoor Air Quality Investigation Procedure by trained investigators. A bilingual research report on the health and safety issues inherent in residential marijuana grow houses and narcotics labs as well as recommendations for rehabilitation of houses previously used for this purpose will be produced. Future study requirements will be identified. The results are anticipated to be used by external organizations to develop protocols for assessing grow homes. A Research Highlight on the study will be produced in Spring 2005.

CMHC Project Officer : *Virginia R Salares* ***CIDN*** : 32180200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

YEARLY VARIATION IN BIOLOGICAL CONTAMINANTS

Ten houses that have previously been characterized for biological contaminants during the winter have been retested a year later to determine the variability of microbiological markers. The data is being analyzed to identify climatic and other factors that may affect year to year measures of biological contaminants in houses. The validity of "one point in time" testing to characterize multi-year biological contaminant loads in houses during the winter will be assessed. This project will increase knowledge of yearly winter variations in microbiological loads in houses, and of testing procedures that provide the most repeatable long term building microbiological markers. One potential outcome would be the confirmation that CMHC's methodology of assessing IAQ problems by inspection alone is still the most accurate assessment of biological contamination without expensive testing nor lab analysis. This may also indicate which testing methodology represents the most stable indicator of long term biological indicators in houses. The results will be available in the summer of 2005.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 32160200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

MANUFACTURED HOUSING

FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY-DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, mobile plant to produce houses that are 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built (with basement foundations pre-installed), and once the construction program is complete, the plant would be dismantled and shipped to the next locale. The final report has been received and is currently being reviewed. The project is expected to be completed by the end of 2004.

CMHC Project Officer : *Chris Ives* ***CIDN*** : 23050201
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MANUFACTURED HOUSING

SERVICING THE SALE (MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM) - PHASE III

This project which was led by the Canadian Manufactured Housing Institute, with the assistance of CMHC and other industry partners developed a new workshop module forming part of CMHI's Manufactured Housing Consultant program. The module, a half-day interactive workshop focusing on "best practices", provides manufactured housing salespeople with the knowledge and tools to help them better serve consumers after the contract has been signed, i.e., throughout the construction, installation and move-in stages, as well as beyond. The training module is now complete and available through the CMHI. For more information on this training module contact Kathleen Maynard at the CMHI by phone (613) 563-3520, or e-mail cmhi@cmhi.ca.

CMHC Project Officer : *Joe Cottitto*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is available
CIDN : 30690200
STATUS : Completed

MOISTURE AND MOLD

CLEAN-UP PROCEDURES FOR MOLD IN HOUSES. REVISED EDITION

Since biblical times, indoor mold growth has been thought to affect the health of those living in a moldy dwelling. Today we are increasingly aware of the link between our environment and our health and well-being. Working with the provinces and territories, Health Canada first provided guidelines stating the need to minimize exposure to fungi and molds in residences in 1987. More specific guidelines for the non-industrial workplace were published in 1993, 1995 and most recently, in 2004. The purpose of this guide is to help homeowners to respond to advice from Health Canada and other health departments in Canada to prevent and, if detected, remove mold growth indoors. It describes a process for dealing with mold in houses and provides detailed guidance both on how to eliminate indoor mold safely and on how to prevent the conditions that allow it to grow.

Prepared by James Scott. CMHC Project Officer: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2004. 90 pages

Order number 61091 **Price $3.95 + GST and handling changes

Nota : Aussi disponible en français sous le titre : Méthodes d'élimination de la moisissure dans les maisons

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

DEVELOPMENT OF DRIVING RAIN MAPS AND LOADS FOR CANADA

The objective of this External Research project is to develop maps of Canada and nomographs that quantify the driving rain load for different types of buildings across Canada. More specifically, the research will (1) extend and document existing driving rain prediction methodologies, (2) collect, analyze and interpret hourly driving rain information as it relates to building enclosure performance, (3) create climate maps and tables that are as useful for the design of building enclosures as current structural load maps and tables are for the design of structural members, and (4) generate a range of statistics and correlations that improve our understanding of the driving rain load and its variation with climate. This project is to be completed by spring of 2005.

CMHC Project Officer : *Silvio Plescia*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 26470207
STATUS : Ongoing

ICE DAMMING FIELD RESEARCH: ICE DAMMING SOLUTIONS

Ice damming is a problem that annually affects a large number of houses in Canada. It can cause water leakage inside the house and can present a danger of falling ice. It may also affect the service life of roofing materials and components.

Ice damming arises from differential melting and freezing of snow on a roof. The root causes of the melting, such as air leakage from the interior into the attic, are frequently far from the roof deck. As a consequence, methods to alleviate ice damming (e.g. electric cables, membranes) often treat the leakage without addressing the fundamental cause. Such methods can reduce or eliminate the leakage in the short term but, because they do not address the cause of the melting and freezing, they often do not provide a long-term solution. In addition, they frequently do not address the durability issues caused by ice build-up on the roofs. The best solution is to change attic conditions to prevent ice damming from occurring.

This report describes the factors that contributed to ice damming in detailed case studies of four low rise condominium complexes and one single family house in Ottawa, Ontario. Each site has suffered severe ice damming in the past. The repair strategy at each site primarily focused on reducing air leakage into the attic from the house. The success of these trial repairs were monitored by attic temperatures and visual indicators. The suggested repairs had benefits on some sites and little benefit on others.

Prepared by Mark Lucuik, Morrison Hershfield Limited. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004.

Note: No. 04-119 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Ice%20Damming%20(WEB).pdf

ICE DAMMING PHOTOS

It is possible that the patterns of ice or snow on residential roofs may be useful in predicting the house tendency to ice damming, or in the locating of the trouble spots. The goal of this project was to photograph roofs of houses in Winnipeg, Toronto, and Peterborough during periods of heavy frost or light snow, and to show the specific roof 'hot spots' or places with preferential melting. The photos taken in the three cities show that there are many houses with differential melting patterns on their roofs. Follow-up photos taken in the snowy winter of 2003/04 in Winnipeg show that ice damming frequently occurs in the vicinity of the areas of high roof melt. The converse situation, does a house without melt patterns avoid ice damming, was not investigated adequately enough to prove the hypothesis. A research highlight has been prepared and will be published in the fall of 2004.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 21420200
STATUS : Ongoing

INVESTIGATE THE INCIDENCE OF PLUMBING RELATED WATER LEAKAGE IN HOUSES

Recent research on molds in houses has indicated a high incidence of reported plumbing related wetting incidents in houses. This study is to investigate the nature of the plumbing incidents that cause moisture problems. Results from this investigation will provide guidance to implement measures required to minimize plumbing related wetting incidents in houses. A research consultant will be selected in fall 2004 and the study report will be available by spring 2005.

CMHC Project Officer : *Ken Ruest*
CIDN : 30880200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MOISTURE PROBLEMS IN SEASONALLY OCCUPIED HOUSING

This research will examine moisture issues of unoccupied houses. There are many dwelling types that do not have occupants for long periods of time. These would include houses where the homeowners go south for a large part of the winter, second houses, houses deserted for periods due to natural disasters, rental houses without occupants for extended periods, and cottages. Unoccupied houses often suffer moisture related damages to building materials, finishes, and house contents. In many cases, there should be simple ventilation solutions that will reduce or eliminate these moisture problems. This project will investigate the types of moisture problems found. The Nova Scotia contractor will analyze moisture sources and removal methods, and then recommend solutions for a variety of sample dwellings. The solutions will depend on whether the unoccupied spaces have electrical power, and functioning heating or ventilation systems. The research will take two full winter seasons and is planned to be complete in 2005.

CMHC Project Officer : *Don Fugler*
CIDN : 27070200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

POTENTIAL FOR MOISTURE PROBLEMS DUE TO PLASTIC SHEETING IN WALL ASSEMBLIES

This project will examine whether plastic air-vapour barriers currently used in Canadian wall assemblies are an asset or a problem. There has been significant criticism recently of the use of plastic in above-grade and basement wall assemblies, in that plastic limits the ability of the wall to dry into the house, and that it provides a condensing plane for water vapour driven into the wall when the sun heats the exterior sheathing. The research will assess the criticisms levelled against plastic sheeting and will compare the use of plastic to other alternatives, using hygrothermal modelling. Field testing in new houses or with test huts will be used to confirm the predicted effects. In the event that this phase of the research is not conclusive, a field survey component could be added to verify whether the predicted problems are happening in Canadian houses. The work is expected to be completed by fall of 2006. A field survey would delay completion until 2007.

CMHC Project Officer : *Don Fugler*
CIDN : 32150200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

REVIEW OF HYGROTHERMAL MODELS FOR BUILDING ENVELOPE RETROFIT ANALYSIS

A research project was undertaken to review and assess commercially available computerized hygrothermal modeling tools that could be used to model heat, air and moisture conditions in 5 pre-selected wall assembly types and a number of given insulation retrofit possibilities. The models were evaluated based on their commercial availability, ability to model the wall types of concern, the degree to which their algorithms were transparent and documented, user-friendliness, technical support, and material property data. Of the models reviewed, two were deemed to be applicable for the analysis of the wall assemblies and insulation retrofits of interest. The selected models will be used in a subsequent research project to assess the hygrothermal response of the selected wall types when subjected to insulation retrofits.

Prepared by Alex McGowan and Martin Gevers, Levelton Engineering Ltd. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2003. 31 pages

Note: No. 03-128 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

WATER PENETRATION TESTING ON WALL SYSTEMS

There is an overall lack of good, qualitative data to compare the drainage characteristics of various claddings, drainage cavity configurations and building materials in wall assemblies. In some jurisdictions across Canada, rainscreen or cavity wall construction will be required (mandated) to manage the expected exterior moisture loads; the City of Vancouver Building By-laws have already mandated the use of rainscreen wall systems. Many new products have been introduced into the marketplace in recent years, which claim to promote and/or improve drainage characteristics and drainage performance of wall systems. However, the actual performance of these products has not been fully evaluated or understood. The objective of this project is to perform laboratory tests to investigate how effectively different drainage cavity configurations (including wall assemblies with proprietary drainage media) are able to drain water or retain water within the cavity space. The study will also investigate where in the wall assembly the moisture is entrapped and how long the wall assembly will dry out (under isothermal conditions). This project is expected to be completed by the summer of 2005.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25620200
STATUS : Ongoing

WIND-RAIN RELATIONSHIPS IN SOUTH-WESTERN BRITISH COLUMBIA

Moisture is one of the important factors affecting the durability, utility and aesthetics of the building enclosure. Rain, particularly wind-driven rain, is often one of the largest contributors to the overall moisture load the envelope experiences, especially in Canada's coastal regions. The objective of this pilot project will be to analyse climate data for numerous stations in southwestern BC (including Vancouver Island) in order to develop a better understanding of the wind and rain relationships. These include wind speed and direction, with and without coincident periods of rain, and the monthly and seasonal variations in those relationships. The research will relate the weather information (rainfall) to the potential impact on the building enclosure (ie. rain intensity). This project is expected to be completed by the end of 2004.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30850200
STATUS : Ongoing

NORTHERN HOUSING

EKONORTH FORUM ON NORTHERN TECHNOLOGY CLUSTER

CMHC supported and collaborated in a National Research Council led initiative to assist in development of community innovation and globally competitive firms in northern Canada. This initiative was launched in the form of a forum where the challenges and opportunities related to this field of work were discussed, and the potential for partnering in the development of an innovation cluster in the North examined. Held in Whitehorse in May 2004, the forum focused on promoting construction and infrastructure technologies, and northern sustainable communities, including discussion on the area of residential construction. A report on the forum is available from the NRC.

STATUS : New Completed Report
AVAILABILITY : Product is available from National Research Council Canada

RENOVATION AND INSPECTION

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE PHASE II

The overall objective of this multiphased Canadian Home Inspector and Building Official (CHIBO) national initiative is to raise the level of competency of the private home inspection industry, the municipal building officials, and the First Nations building officers and establish a qualified and recognizable industry to better serve their clients. Phase I activities resulted in the development of Occupational Standards for each of these sectors. Phase II is now underway which will build on the results of the Phase I to perform a training gap analysis and to develop certification and accreditation models for the inspection industry. Phase II activities will be completed by spring 2005. The certification and accreditation models are anticipated to be implemented by the industry sectors later in 2005.

Note: No. 04-112 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

CMHC Project Officer *: Joe Cottitto*
Division : Policy and Research Division
AVAILABILITY : Research highlight is available

CIDN : 25150200
STATUS : Ongoing

INVESTIGATING CLAIMS AGAINST HOME AND PROPERTY INSPECTORS

One of the fastest growing sectors in the housing market is the home and property inspectors sector. A home and property inspector (HPI) mainly inspects existing homes and commercial buildings. The home/property inspection sector includes sole-operators, firms, and franchised businesses. Although many HPIs are professionals with satisfied clients, from time to time they are involved in legal action with a client. Recently, some insurance companies have challenged the sector by refusing some HPIs errors and omission insurance.

The purpose of this study is to focus on the nature of complaints filed against HPI. The data on insurance claims from 1997 to 2003 reveals that most of the claims appear to be focused on structural issues such as cracks in the foundation (30 claims filed). The next claims most often made against home inspectors are water in the basement (29 claims filed) followed by structural general including walls and some foundations (19 claims filed).

The majority of the claims are from Quebec followed by Ontario, British Columbia, Alberta, Nova Scotia, New Brunswick, Newfoundland, Prince Edward Island and Saskatchewan. No claims were filed in Manitoba. This only represents claims filed and not complaints against home inspectors. The data showed that the insurance companies were paying out more in claims than they were receiving in insurance fees.

The interviews and review of documents, including jurisprudence, show that some HPI are involved in legal challenges because they failed to adhere to the standard of practice or carried out their activities beyond the scope of the national occupational standards. In addition, some HPI are not properly trained in specific areas such as building sciences. Many of the courses available to HPI through industry associations may need to be reexamined to ensure that proper information is being provided.

Recommendations on how to reduce insurance claims and complaints against HPIs are included in the report.

Prepared by John Kiedrowski, Claude Lawrenson, Kiedrowski & Associates. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2004. 59 pages

Note: No. 04-114 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Investigating%20Claims(w).pdf

NEW HOME PRE-DELIVERY INSPECTION PROTOCOL FOR PRIVATE HOME INSPECTORS

The purpose of this protocol is to make available a generic model pre-delivery inspection protocol for new homes, developed with the guidance of all affected parties. The protocol is intended to serve as a voluntary quality assurance tool to provide a consistent pre-delivery inspection for verifying that the systems and components of the new home are installed and functioning properly as intended, and that it has been constructed according to the contract documents, e.g. plans and specifications. The protocol will include two types of inspections, one to verify that the systems and components are installed and functioning properly by evaluating the workmanship and materials in the home against a prescribed and measurable set of guidelines (Performance Inspection), and the other to verify that the home is constructed according to the contract documents (Contract Compliance Inspection). Some organizations such as warranty providers have, or are in the process of developing their own performance guidelines. Where the user of this protocol deems other performance guidelines are appropriate, relevant and acceptable, those performance guidelines may be substituted for those included with this protocol. In addition to the protocol, a one-day training module is being developed for home inspectors and a half-day module for builders. The protocol is anticipated to be available late 2004.

CMHC Project Officer : *Joe Cottitto*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28170200
STATUS : Ongoing

NOTE: See also p. 106

ADVANCEMENT OF COMPETENCY IN INTEGRATED SUSTAINABLE BUILDING DESIGN - SUPPORT OF CONCORDIA UNIVERSITY IN THE 2005 'SOLAR DECATHLON'

In this project, and as one of various contributors, CMHC will support the team entry led by Concordia University to participate in the 2005 Solar Decathlon in Washington D.C. Based on a preliminary competition, nineteen teams have been selected to participate in this event; the majority of the teams are from the United States, with one each from Canada, Spain and Puerto Rico. The nineteen university teams are to build small solar houses, of about 60 to 70 square metres in size, in the National Mall in front of the Capital Building. The objective is to design a completely solar powered house that is self-sustaining for an entire week. Specified requirements include minimum lighting levels, acceptable interior temperature range, water usage and hot water temperature levels. The houses must be able to accommodate normal domestic tasks such as laundry, cooking and showering. CMHC's involvement will include financial and implementation support to the process, technical advice and guidance, and creating and transferring knowledge on renewable energy based sustainable housing. This project's overall outcomes are:

- 1) To illustrate how solar energy can improve mankind's quality of life: solar energy is clean; it significantly reduces pollutant emissions; and solar energy is renewable thereby increasing a nation's energy security.
- 2) To teach the solar decathletes and the public about how energy is used in their daily lives and to illustrate how energy intensive different daily activities are.
- 3) To demonstrate that market-ready technologies exist that can meet the energy requirements of our daily activities by tapping into the sun's power.
- 4) To meet these needs while providing an attractive structure in which to live, work and play.

A related long-term objective of this project is to build enhanced alliances between project partners leading to the capacity development for a future Canadian Solar Decathlon competition.

CMHC Project Officer : *Thomas Green*	***CIDN*** : 32060200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

CANADIAN SOLAR HOME TOUR IMPLEMENTATION GUIDE

This project will study and derive lessons from existing eco-home tour examples and create a generic tour implementation package for use by communities across Canada to host local eco-home tour events. The "how to" eco-home tour guide kit will include information on an analysis of costs and benefits, and will identify recommended key partner organizations, optimal dates, potential lead facilitators, generic forms, associated website material and announcements. Hosting an inaugural event in the summer of 2005 to test and finalize the package will be part of this project. The project outcomes include increased awareness and understanding of the potential and realized successes of renewable energy and solar applications for sustainable housing. Successful eco-home tour events engage home owners and the interested public in dialogue that can lead to changes in attitude about housing alternatives and lead to changes in behaviour and practice.

CMHC Project Officer : *Thomas Green*	***CIDN*** : 32070200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

CRITERIA AND METHOD FOR EVALUATING SUBDIVISION PLANS FOR LIVABILITY AND SUSTAINABILITY

This project will examine what, if any, criteria are currently used by municipalities to evaluate development plans for livability and sustainability. The project will consist of a literature review and an examination of the criteria and evaluation methods of 10 Canadian municipalities.

CMHC Project Officer : *Fanis Grammenos* | ***CIDN*** : 31710200
Division : Policy and Research Division | ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available | ***NEW***

DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF

The purpose of this project is to develop a set of environmentally sustainable site and building design, construction and operation guidelines for single and multi-family unit housing, motels and hotels for the Town of Banff in a manner which could be used to inform the development of similar guidelines for other communities across Canada.

STATUS : Completed
AVAILABILITY : There will be no product for this project

DEVELOPING A GREEN RATING SYSTEM FOR RESIDENTIAL BUILDINGS

In cooperation with industry, the Canada Green Building Council (CaGBC), the Greater Vancouver Regional District (GVRD), Southern Alberta Institute of Technology (SAIT) and Natural Resources Canada (NRCan), this project will research green building rating systems which have been developed for the residential market and determine the utility of these systems and whether the systems meet the needs in Canada of both the low-rise and high-rise residential markets. The study will provide a list of recommendations which need to be incorporated into an existing, or developed into a new residential rating system. The project will provide information on existing green rating systems for the residential industry, make recommendations with regard to the need for the development of a comprehensive green rating system for the residential market, and through consultations, access the readiness of industry to deliver green housing. This research will be contracted in autumn of 2004. A project report and Research Highlight will be available in autumn of 2005.

CMHC Project Officer : *William Semple* | ***CIDN*** : 32100200
Division : Policy and Research Division | ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available | ***NEW***

INTEGRATED DESIGN CHARRETTE FOR SUSTAINABLE AFFORDABLE HOUSING: CHARRETTE RESULTS, CALGARY, AB

The 2-day Integrated Design Charrette for Sustainable Affordable Housing was held in Calgary on January 21st - 22nd, at the Carriage House Inn, near by the proposed development site. The goal of the charrette was to examine possible design solutions for the creation of a sustainable, affordable housing community for those who cannot afford the higher prices that have become the norm for the City of Calgary.

Dome Britannia Properties wanted to have a flagship model of sustainable and affordable residential development. As such, the specific objectives for the design charrette were as follows:

- Ensure that any design concepts take into consideration green/environmental stewardship. The development should utilize the best in sustainable development technology and applications.
- Succeed in encouraging its occupants to adopt environmentally friendly practices in their day-to-day lives.
- Create a project that can integrate people from different walks of life with the objective of creating a framework for a vibrant sustainable community. The project may include a combination of market, near market, affordable and seniors' housing. Recreational facilities and programs, interaction between children and seniors, green spaces and the possible inclusion of medical or commercial amenities are all examples of what could be included in the overall concept.
- Determine the pros and cons of rental versus ownership. The development could allow for rental units or owner occupied units.
- Create affordable housing. The rent of a two bedroom unit to be around $600/month.
- Provide the balance between the provision of affordable housing and the costs of sustainable development.

The costs for the sustainable development should be the same as for conventional development, or, at the very least, the payback on ongoing cost saving measures must have a reasonable time frame attached. If the costs of going green are incrementally higher, determine the possibility of subsidies, grants, private donations or discounted interest rates from green or socially conscious lenders, which may be available to defray those additional costs.

This report describes the Integrated Design Process used, the teams, the resources, results, analysis and conclusions of the charrette.

Prepared by Shari Imada and Scott Pickles. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2004. 22 pages

Note: No. 04-102 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : On a loan basis from the Canadian Housing Information Centre

NOVA SCOTIA HEALTHY/FLEX HOME: MONITORING AND CASE STUDY

Advanced energy efficient, integrated housing designs are often cited as the necessary approach to housing and environmental issues today. However, few good examples exist to date, especially when an affordability parameter is also included in the equation. Thus, more information and a better understanding are needed as to how to create fully integrated designs and achieve performance goals within reasonable costs, and how this type of housing actually performs in practice. This project will monitor and evaluate how the Nova Scotia Healthy/Flex house performs with respect to energy efficiency.

CMHC Project Officer : *Thomas Green*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 28840200

STATUS : Ongoing

REGIONAL BENEFITS OF GREEN ROOFS

CMHC is contributing to several research studies and demonstrations of green roofs by assessing the benefits derived from this practice in various climate regions of Canada. Studies include those of Vivre en ville in Quebec, NRC's Green Roof Consortium and a CMHC External Research project by the British Columbia Institute of Technology (BCIT). Each study will report on the construction methodology and specifications of the green roof as well as monitored results. The goal of CMHC's work is to show the requirements, costs and benefits of residential green roof systems in Canada as a result of the effects, for example, of type of installation, local climate, energy and regulatory regimes. The work is expected to be completed by summer 2006.

CMHC Project Officer : *Sandra Marshall* — ***CIDN*** : 30430200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

STORM WATER MANAGEMENT AND ENVIRONMENTAL BENEFITS PROVIDED BY GREEN ROOFS IN MULTI-FAMILY HOUSING

Jointly funded by the British Columbia Institute of Technology (BCIT), the National Research Council, the Greater Vancouver Regional District,and CMHC's External Research Program, this research project will evaluate the performance of green roofs in a testing facility built at BCIT. It will gather and analyze data with respect to delaying storm water run-off and reducing run-off volume, as well as the cooling and insulating abilities of the roof system. Cost analysis will include energy cost savings and the cost of structural upgrades to support the roof. Expected date of completion is the fall of 2005.

CMHC Project Officer : *Sandra Marshall* — ***CIDN*** : 26470213

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

TAP THE SUN: REVISION AND UPDATE

This project will revise and update the CMHC "Tap the Sun" publication and accompanying CD-ROM. "Tap the Sun" is a primer on passive solar design, and presents various passive solar techniques and Canadian home designs. The revised "Tap the Sun" product will include important data updates, a wider selection of case study projects, more detailed key resources, and improvements to the integrated tools such as the Comfort Design Checker and the window products design database. As well, the accompanying CD-ROM may include other related software tools such as the RETScreen Solar Heating Module by NRCan. The revised product will be available in 2005.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 25450200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

NOTE: See also p. 115-119

EVALUATION OF WATER CONSERVATION PRACTICES

This research will provide municipalities with guidance in creating a cost effective water efficiency plan (WEP). The use of a standardized WEP will allow for practical and useful comparisons between water efficiency programs implemented across Canada. A template WEP will be developed to incorporate the variety of necessary parameters to be considered such as water source, population size and growth, regional socio-economic, climatic and geographic conditions, infrastructure status, target changes in water demands and wastewater flows, projected capital works and related costs, cost/benefit. The WEP template will include a software database for creating a water efficiency plan plus a report documenting the key components of water efficient planning. A draft report has been received and is under review. The final report is anticipated to be published by December 2004.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30550200
STATUS : Ongoing

FIELD VALIDATION OF A RISK ASSESSMENT MODEL FOR ONSITE WASTEWATER SYSTEMS

The objective of this research project is to validate the Onsite Wastewater System Risk Assessment Model currently under development, by comparing field data of system failure to model parameters such as soil type, lot size or system age. Model validation will be based upon a comparison between signs of system failure and high risk ratings returned by the model. A proven risk assessment model can serve to assist planners, developers, and builders in determining the appropriateness of various onsite systems for different geological areas. With regards to existing systems, this tool can be used to assist municipalities in identifying high risk areas in order to prioritize inspection programs and remedial work. A draft report has been received for review and a final report is anticipated for May 2005.

CMHC Project Officer : *Catherine Soroczan*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 26470219
STATUS : Ongoing

INVESTIGATION INTO GERMAN RAINWATER CISTERN LEGISLATION, INCENTIVES AND CASE STUDIES

The purpose of this project was to find the appropriate agencies and contacts within Germany regarding rainwater cistern issues, and to document information related to rain water cistern use within Germany. A similar report on cistern issues within France and Belgium has now been completed in draft form. A Research Highlight on the two draft reports is anticipated for May 2005.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 20870200
STATUS : Ongoing

MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

This project's objective is to determine the impact of CMHC's Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term? What effect does the Guide have on outdoor water use during the summer months? What extra impact does a complementary social marketing campaign have on consumer behaviour? This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used. The widely fluctuating irrigation demands during the summer of 2001 made it difficult to accurately assess the effectiveness of the Guide. A follow-up analysis was undertaken during the summer of 2002. A draft final report has been received and a highlight is currently being written to summarize the various reports into one. This highlight will be available in December 2004.

CMHC Project Officer : *Catherine Soroczan*
CIDN : 23410200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Research highlight is not yet available

MAXIMUM PERFORMANCE TESTING OF POPULAR WATER-EFFICIENT TOILET MODELS: FINAL REPORT

In this project led by the Canadian Water and Wastewater Association (CWWA), CMHC, in partnership with 15 other Canadian and American agencies, assessed the performance of approximately 40 ULF toilets in order to:

- 1) develop a performance assessment and relative ranking of each of the models based on"realistic" test media;
- 2) perform a water exchange test to determine each fixture's ability to evacuate all of the waste, and
- 3) determine the proper flush volume setting for each fixture when fitted with different brands of adjustable replacement flappers.

The results indicate that approximately 1/3 of toilets meeting the CSA standard failed to flush the designated minimum amount of media. The findings from this work have generated much interest from water agencies, manufacturers and regulators. Some jurisdictions are using these results to help determine which toilets to include within their rebate programs.

Prepared by William Gauley and John Koeller. CMHC Project Officer: Cate Soroczan. Ottawa: Canada Mortgage and Housing Corporation, 2003 (Housing Technology Series). 26 pages

Nota : Aussi disponible en français sous le titre : Test du niveau maximal de rendement de toilettes offertes sur le marché

Note: No. 04-109 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report (Order number 63505) and Research Highlight
AVAILABILITY : CMHC Information Products

STUDY OF DRAINLINE CARRY AND LOW FLOW TOILETS

CMHC in conjunction with Manitoba Conservation, City of Calgary, City of Toronto, Ontario Ministry of Municipal Affairs and Housing, Region of Durham, and the Region of Waterloo has undertaken a project to address the impact of 6-litre toilet technology on drainline carry. This work was in response to concern expressed over the ability for 6 litre flows to effectively carry waste and not contribute to drainline clogging and backup. The project will address the impacts of: slope, pipe diameter, sags, mass loading and pipe length on removal performance. A total of 9 different flush types will be tested including: wash down, flapperless, rim jet, and vacuum assist. Initial results indicate that parameters affecting drain line carry are loading mass, flush type and pipe slope. Further results will be available by January 2005.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing
NEW

WATER REUSE STANDARDS AND VERIFICATION PROTOCOL

This report summarizes water reuse standards and treatment technology verification protocols, used by various countries, states and provinces worldwide. Effluent quality standards were examined with respect to biological, biochemical and physical water quality parameters. The assessment focused on municipal and residential water reuse applications, including toilet flushing, bathing, showering, laundry, washing, landscape & garden irrigation. The report also identified treatment technology verification protocols in use for both lab and field testing appropriate for reuse applications.

Although monitoring protocols exist for treatment plants that had been installed for reuse applications, few of those identified were intended to test and verify system performance prior to field installation. Nine testing protocols were identified. These protocols test a wide range of wastewater technologies, from domestic, onsite wastewater treatment systems for water reuse, to ship-board treatment systems, potable wastewater treatment systems and disinfection systems. This document provides a summary of resource requirements for protocol laboratory and field testing equipment along with associated testing cost estimates.

A workshop was held with government and industry representatives to discuss appropriate water quality standards and verification protocols for water reuse applications in Canada. A comparison is presented between the reuse standard recommendations arising from the workshop and comparable international standards.

Prepared by Troy Vassos, NovaTec Consultants Inc. CMHC Project Officer: Cate Soroczan. Ottawa: Canada Mortgage and Housing Corporation, 2004. ix, 65 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Water(w).pdf

SOCIO ECONOMIC RESEARCH

CAPITAL REPLACEMENT PLANNING

This project will provide a description of what a replacement reserve plan is and provide simple steps for groups to put a plan in place. The replacement reserves planning project will focus on the development of a manual and trainer manual. These will be targeted to staff and volunteers who are involved in replacement reserve planning.

CMHC Project Officer : *Deborah Taylor* **CIDN** : 23241500
Division : Assisted Housing Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY

Urban residential mobility is the movement of individuals or households within the same urban area. Aboriginal people living in urban areas move more frequently than non-Aboriginal people do. For example, in 1991, the urban Aboriginal mobility rate was 1.8 times higher than the rate among non-Aboriginal people.

Past research has indicated that while there are many reasons why Aboriginal people move so frequently, housing seems to be almost always important. Aboriginal people move in search of more affordable, suitable and adequate housing. They also move because of family reasons, for example, household size changes, conflict or breakdown; and because they are often looking for better access to community services or employment opportunities.

High mobility among urban Aboriginal people can affect social service agencies that provide services for Aboriginal people, as well as their clients. This research explored the effects of urban Aboriginal residential mobility on agencies that provide social services to Aboriginal people, and their clients, in two Canadian cities where proportions of Aboriginal people are high— Regina, Saskatchewan and Winnipeg, Manitoba.

Prepared by Saskatchewan Indian Institute of Technologies. CMHC Project Officer: Marcelle Marie Gareau. Ottawa: Canada Mortgage and Housing Corporation, 2004. 56 pages

Note: No. 114 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Report_Effects_w.pdf

ESTABLISHMENT OF ON-RESERVE HOUSING AUTHORITIES

This research project will investigate and document the process of establishing a First Nation housing authority. The report will identify issues, challenges and success factors experienced by existing First Nation Housing authorities. A number of potential housing authority models will also be developed.

CMHC Project Officer : *Line Gullison* **CIDN** : 31841500
Division : Assisted Housing Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

EXAMINATION OF THE USE OF DOMESTIC SPACE BY INUIT FAMILIES LIVING IN ARVIAT, NUNAVUT

During the summer of 2002, the author spent two months living in the community of Arviat, Nunavut, documenting patterns of housekeeping among Inuit families. The objective of the project was to answer the following question: Are the domestic activities of Inuit families compatible with the spatial configuration of Euro-Canadian house models currently used in the Canadian Arctic? Observations of Inuit space use were organized into a relational database, and used in combination with the spatial analysis of houses occupied by Inuit families. The spatial analysis was completed using a number of innovative computer-based techniques for analyzing architecture developed at Space Syntax Laboratories, University College London. This project represents the first time these techniques have been applied in Canada.

Recent ethnographic fieldwork in the Canadian Arctic has revealed differences in the patterning of domestic activities by Inuit and Euro-Canadian families. These differences are reflected in the types of activities Inuit families carry out, and how these activities are distributed within houses. The majority of Inuit family activities occur in integrated spaces such as living rooms and kitchens, because daily activities provide an important context for social interaction among family members. The use of space syntax analysis to examine houses built over the past 50 years in the Canadian north indicates a trend towards floor plans with narrow view fields and a greater number of smaller rooms. This trend reflects the increasing importance of individualism and privacy in Euro-Canadian society, and is not compatible with the more collective forms of social interaction that characterize Inuit families. These results should be of importance to architects and planners interested in designing and building houses that better reflect the cultural values and lifestyles of Inuit families.

Prepared by Peter C. Dawson. CMHC Project Officer: Marcelle M. Gareau. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 86 pages

Note: No. 04-031 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR%20Examination(w).pdf

EXPLORATION OF HOUSING OPTIONS FOR ABORIGINAL PEOPLE IN EDMONTON AND WINNIPEG

As a first step to predict what housing will be needed in the future for Aboriginal people, and what strategies could be implemented to better address Aboriginal housing needs, this research will examine the housing situation of Aboriginal people in Winnipeg and Edmonton. It will look at the characteristics of the housing stock occupied by Aboriginal people; explore the types of housing options that Aboriginal people need and prefer; and examine how various forms of home ownership can become more widespread among Aboriginal people.

CMHC Project Officer : *Marcelle M Gareau*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 26730200

STATUS : Ongoing

FEASIBILITY OF COMMUNITY RISK MANAGEMENT AS A SUBJECT FOR CAPACITY BUILDING IN ABORIGINAL COMMUNITIES

The objective of this project is to ascertain what are the components of risk management that are relevant in an Aboriginal community context, and to assess these against pragmatic criteria (as to whether the components can be taught in a capacity development environment & carried out by a typical Aboriginal community). The following tasks are envisaged: to review text and existing course materials; to determine what materials are relevant; to carry out interviews with risk management professionals & institutes, practitioners, CMHC, INAC & other capacity development personnel & Aboriginal groups; to do analysis; and to make recommendations for course content & training methods.

CMHC Project Officer : *Ed Nera*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 24280200

STATUS : Ongoing

HOUSING EDUCATION PROGRAM PHASE A: A SUMMARY AND CONSULTATION REGARDING EXISTING RENTAL HOUSING IN CREE COMMUNITIES (EASTMAIN PILOT PROJECT) 2001: FINAL REPORT

This project arises from the acknowledgement that the concept of rent in Cree culture is neither clear nor obvious. Based on the experience of CMHC and the Cree Housing Authority, both long involved in housing issues, and the skills and experience of the consultants and architects, the project attempted to reveal the inadequacies between the rental system and the residents' needs and expectations.

The initial task of this project (Phase A) was to summarise the existing financial arrangement regarding housing, as envisioned by CMHC, the Cree Housing Authority and the local government of Eastmain, and then to communicate the system within the Cree community of Eastmain. This involved the development of visual communication tools explaining the existing rental housing system and the organisation of a public consultation process. This consultation was intended to present and inform the tenants about rental housing concepts and offered also an opportunity to discuss a Native vision of this system. Their concerns, comments and reactions would provide essential information during this exchange. The study attempted to reveal:

- The structural, social, and cultural deficiencies inherent to the actual rental system
- Factors that lead toward non-payment of rent
- Possibilities for future research paths that serve to break the pattern of non-payment of rent.

Prepared by the CRA (Martin Desgagné) and box architectures (Isabelle Champagne and Maïti Chagny) for the Cree Nation of Eastmain and Eastmain Rental Housing Department with the financial support from CMHC, the Cree Regional Authority and the Cree Nation of Eastmain. Ottawa: Canada Mortgage and Housing Corporation, 2003 (CMHC External Program Research Report) 62 pages

Note: No. 04-010 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR%20Education_FINAL(w).pdf

PATTERNS AND TRENDS OF URBAN ABORIGINAL RESIDENTIAL SETTLEMENT

This project will investigate the housing patterns of urban Aboriginal people and the links between these and the socioeconomic outcomes for these people, either positive or negative, associated with living in Aboriginal neighbourhoods. Housing settlement patterns in the major urban areas of Canada with substantial Aboriginal populations will be described statistically, using established indices for spatial distributions of population (evenness, clustering, concentration, centrality and isolation) at different levels of geographic aggregation. The statistics will be discussed in terms of the pros and cons of the indices and geographies for each urban centre. The statistics will then be input into an analysis with a selection of socioeconomic census variables. These variables will be chosen for their potential relevance to social and economic outcomes that have been suggested in the research literature.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25570200
STATUS : Ongoing

RESPONSIVE RESEARCH INTO ABORIGINAL HOUSING ISSUES: A PILOT PROJECT

This project is a partnership of CMHC, Indian and Northern Affairs Canada, Aboriginal Healing Foundation and the Policy Research Initiative. The project will fund four research grants to university scholars for studies that combine an Aboriginal perspective, a housing & community focus and strong mentoring of new researchers. Also included is an evaluation of the grant process. One research study has started which looks at housing issues for Aboriginal post-secondary students.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25320200
STATUS : Ongoing

REVIEW OF TRAINING AND DELIVERY OPTIONS CONCERNING ABORIGINAL HOUSING

One of the consequences of the growing Aboriginal population and of the greater control Aboriginal groups have over their housing portfolio, is that Aboriginals' housing skills in the areas of management, construction and repairs will become increasingly important. In view of this, and of budget constraints, training will need to become as effective as possible.

The overall project objective was to identify training approaches that were innovative, could supplement the more conventional approach of a teacher-student exchange and could be successfully applied to future housing-related Aboriginal training programs.

Information was sought both nationally and internationally from public, private and Aboriginal sources involved in the delivery of training programs to address the following main research themes:

- What housing-related training and training delivery approaches have been used over the last 10 years?
- What innovative training and delivery approaches, other than the conventional techniques of teacher/student exchange, have been successfully applied in reference to Aboriginal People and First Nations communities in Canada?
- Where can funding for unconventional training and delivery ventures be obtained?

The research was carried out in two phases. The initial phase included a review of a wide variety of alternative and innovative training programs dealing with numerous training topics including, but not limited to, housing-related training. The researchers also examined geographical and cultural variances in defining successful training initiatives and what was innovative.

The review encompassed initiatives that were undertaken during a 10-year period (1991 to 2001) in Canada and abroad. Approximately 60 training programs were reviewed as part of the initial phase of the research. For the second phase, eleven training programs in the preliminary review were identified as providing innovative and alternative training techniques that applied to Aboriginal People in Canada in the area of housing related training. An in-depth analysis was undertaken of these eleven initiatives.

Prepared by Turtle Island Associates. CMHC Project Officer: Marcelle Marie Gareau. Ottawa: Canada Mortgage and Housing Corporation, 2004. 87 pages

Note: No. 04-033 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Review%20Traning(w).pdf

SHARING THE STORY: EXPERIENCES IN FIRST NATIONS, INUIT AND NORTHERN COMMUNITIES COMPREHENSIVE COMMUNITY PLANNING

This document shares the stories of community planning in some First Nations, Inuit and northern communities in Canada. The communities have different backgrounds, circumstances and priorities. This results in a rich diversity of planning experiences from which much can be learned.

These stories focus on some of the most current and relevant challenges and opportunities facing First Nations, Inuit, and northern communities today. The planning topics and communities are discussed in the following theme areas:

- Community relocations and land base expansions;
- Northern communities;
- Rural and urban communities;
- First Nations Land Management Act (FNLMA) Communities; and
- Self-government Communities

Each planning theme area has a brief overview, followed by the community profiles. Every community profile is unique. These profiles are good examples of the different kinds of community planning approaches that other First Nations, Inuit and Northern communities may wish to learn from. This tool exists to help communities learn from each other while increasing their own sustainability and empowerment.

This project was supported by Indian and Northern Affairs Canada, Public Works and Government Services Canada and the Canada Mortgage and Housing Corporation.

Ottawa: Published under the authority of the Minister of Indian Affairs and Northern Development, 2004. 129 pages

Nota : Aussi disponible en français sous le titre : Anecdotes de réussite : Expériences des collectivités inuites, autochtones et nordiques en matière de planification communautaire globale

Note: No. 04-029 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Available on the Internet at: www.pwgsc.gc.ca/rps/inac. Print copies can be obtained from 1-800-567-9604 (TTY only 1-866-553-0554)

TEMPORARY SUPPORTIVE HOUSING FOR ABORIGINAL PEOPLE AND THEIR FAMILIES

First Nation members in many communities in northern Ontario must travel to regional centres to access community services, such as medical, health, educational and employment services. In most cases, they must also find temporary accommodation while accessing the services. The objective of this research is to examine the temporary housing situation of these First Nation members. The research will examine needs, preferences and issues while identifying solutions. The research will provide a general overview of the current situation concerning temporary accommodation in Sioux Lookout, Fort Francis, Kenora and Thunder Bay. This will include identifying the types of accommodation that are available, the reasons for which these accommodations are being used, and the costs that are associated with them.

CMHC Project Officer : *Marcelle M Gareau*
CIDN : 26740200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING

The objectives of this project are:

1) to obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba;

2) to quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility and social cohesion; and

3) to explore the effect that discrimination in housing for Aboriginal people has with regard to other victimization.

CMHC Project Officer : *Phil Deacon*
CIDN : 19900200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

USE OF DESIGNATED LAND ON-RESERVE FOR AFFORDABLE HOUSING

This research project will investigate and document the issues, impediments and opportunities in using designated land to facilitate affordable housing on-reserve and will communicate the results to First Nation communities and other stakeholders involved in housing on-reserve.

CMHC Project Officer : *Kathy Hogue*
CIDN : 31691500
Division : Assisted Housing Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

ABORIGINAL HOUSING

WIDER ACCEPTANCE OF MANUFACTURED HOUSING IN FIRST NATION COMMUNITIES IN THE ATLANTIC REGION

This project will research and demonstrate the economic and social development benefits that may be derived from this housing type. It will bring together representatives of First Nations communities and manufactured housing in the Atlantic. The manufactured housing to be used in the demonstration will reflect CMHC's Healthy Housing principles, including those related to indoor air quality, mold, and, where basements are included as opposed to slab on grade, basement design. The resulting report will present manufactured housing as one of the approaches to address housing needs in First Nations.

CMHC Project Officer : *Thomas F Levesque*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30250200
STATUS : Ongoing

NOTE: See also p. 7-9

CHILDREN·S ENVIRONMENTS

HOUSING QUALITY AND CHILDREN'S SOCIOEMOTIONAL HEALTH

This External Research Project (ERP) examined whether housing form and quality are related to the socio-emotional health of children. It used standardized measures of housing quality and mental health, two major housing forms (single family and low-rise cluster), and considered the role of various potentially moderating influences, including socioeconomic status and indoor population density to answer the basic question: "How, if at all, does housing form and quality affect the socio-emotional health of urban Canadian children?" The findings of the study assert the presence of a link between housing quality and children's socio-emotional health. Child behaviour problems, as assessed by parents, occurred when the physical condition of the residence's interior and exterior, and the neighbourhood, as assessed by both teachers and parents, was worse. These relations remained after controlling for household income, parent's education, parent's mental health status, child's gender, and time lived in the residence, and the relations were not significantly moderated by any of these factors.

Prepared by Robert Gifford for Optimal Environments Inc. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2003 (CMHC External Program Research Report) 76 pages

Note: No. 03-021 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/childrensociohealth.pdf

COMPARING CANADIAN NEW-URBANIST AND CONVENTIONAL SUBURBAN NEIGHBOURHOODS

Initially, the Consultants will conduct a brief literature review of new urbanist projects in Canada to help determine the best projects to examine for this study, as well as any post-occupancy results that may exist. They will also examine post-occupancy studies of new urbanist projects in the U.S. The study will gather and compare data from New Urban Developments (NUDs) and Conventional Suburban Developments to determine if households in NUDs: 1) use their cars less for weekday urban travel; 2) have closer access to daily destinations and better pedestrian connectivity; 3) have more housing choice; 4) consume less land per housing unit, etc.

CMHC Project Officer : *Susan Fisher* ***CIDN*** : 30610200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

ECONOMIC DEVELOPMENT IN SMALL COMMUNITIES

Small communities are characteristics of all provinces and territories in Canada. They vary not only by size, population density and economic activities, but also by degree of economic maturity. Over time, some of these communities have matured, while others have remained relatively unchanged. Still others have declined or even disappeared. However, there is no analytical tool to assess the economic characteristics and status of small communities in Canada. Hence, this project is intended to develop a framework that will enable analysts to gauge the stage of economic development of small communities, and the presence and direction of any trends.

CMHC Project Officer : *Jessica Yen* ***CIDN*** : 30790200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

CMHC Project Officer : *Kevin Hughes* ***CIDN*** : 24370208
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SOCIO-ECONOMIC BASELINE BETWEEN CITIES AND RESERVES

The objectives of this study are to use model estimations and a scan of relevant literature to: (i) develop an understanding of the similarities and differences between the economies of non-reserve and reserve communities; and, (ii) to develop an understanding of how the relative development of a community, reserve or non-reserve, impacts the overall economics of the community.

CMHC Project Officer : *Tan M Crombie* ***CIDN*** : 28670200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CONSUMER INFORMATION

LAND TITLE CONVEYANCE PRACTICES AND FRAUD

The purpose of this study is to produce, for the province of Quebec and the Common Law provinces and territories which are using, or in the process of converting to, a land title registry system (rather than the older deeds registry system still in use in Nova Scotia, Prince Edward Island and Newfoundland and Labrador), a detailed description of title conveyance and mortgage registration, funding, and discharge practices. It also covers the related legislative and regulatory framework, and insurance, recourse and/or compensation schemes related to fraud in title conveyance or mortgage registration, funding or discharge, available to lenders, other parties involved in providing these services and/or to the public. More specifically, this report deals with two distinct types of fraud. The first type, "fraud on the registry" occurs when documents which are forged or otherwise invalid are registered in the land registry. The second type, "fraud by breach of undertaking," occurs when the lawyer or notary acting for the vendor in a transaction misappropriates the purchase money and fails to apply it to pay off an existing mortgage granted by the vendor.

Principal investigator: Norman V. Siebrasse. Research assistance from: Kelly Murray, Charles (Chuck) Johnstone, Sara Cockburn. Ottawa: Canada Mortgage and Housing Corporation, 2003, c2004 (Housing Affordability and Finance Series) 107 pages

Order number 63430

Nota : Aussi disponible en français sous le titre : Les pratiques et la fraude en matière de transport de titres fonciers

Note: No. 04-023 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : CMHC Information Products

CONTAMINATED LANDS

BROWNFIELD REDEVELOPMENT FOR HOUSING IN CANADA - LITERATURE REVIEW AND CASE STUDIES

The project will research and document issues and best practices for the redevelopment of brownfield sites for housing across Canada. A literature review will be undertaken to update information on issues and barriers to redevelopment of brownfield sites for housing. Key informants, such as developers, municipal planners, other government agencies, financial institutions and legal experts will be interviewed. The report will include an annotated bibliography and a summary and analysis of the major findings, including the current key issues as they relate to brownfield redevelopment for housing. Research issues will include financial constraints, legislation affecting brownfield redevelopment, and current incentive programs and policy options. Best practice case studies will be prepared for built residential projects as well as initiatives that encourage brownfield redevelopment for housing. Each case study will include land use planning and regulatory approvals, project financing and marketing, design and construction, environmental remediation and other special circumstances.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31800200
STATUS : Ongoing

NOTE: See also p. 18-20

CO-OPERATIVE HOUSING PROGRAMS EVALUATION = ÉVALUATION DES PROGRAMMES DES COOPÉRATIVES D'HABITATION

This evaluation investigated the housing and other benefits provided through the federal co-operative housing programs. The purpose was to determine whether co-operative housing programs have provided adequate, affordable, democratically controlled and member operated housing for low- and moderate-income households and whether there are other benefits of co-operative housing. Although federal funding for new co-operative housing projects was terminated in 1993, loan and subsidy assistance on existing co-operative housing has continued since 1993 for 1,976
projects containing 65,273 housing units. The current evaluation included this total stock of co-operative housing assisted through four federal programs since 1973 which continue to receive housing subsidies amounting to roughly $200 million annually.

This evaluation used a comparative methodology to assess differences between co-operative housing and other tenures (including non-profit and private rental and condominium ownership), and to compare the co-operative housing funded under the four federal housing programs. Multiple sources of data were used where possible to provide relevant indicators.

The evaluation concluded that:

- Overall, the 1,976 co-operative housing projects with 65,273 housing units financed under federal programs since 1973 are providing adequate, affordable housing for low- and moderate-income households and residents' involvement in their housing has generated additional benefits such as improved security of tenure and quality of life.
- The government expenditures are enabling households that would otherwise not be able to afford alternatives to rental housing to achieve benefits not available in rental housing such as greater security of tenure and resident control of their housing.
- The main challenges for the future are in areas such as ensuring efficient utilization of the co-operative stock, ensuring the affordability of the housing provided, addressing repair needs to maintain conditions and resolving financial difficulties that some co-operatives experience.

Prepared by Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2003. 1 CD-ROM Bilingual

STATUS : Completed CD-ROM
AVAILABILITY : Canadian Housing Information Centre

DEVELOPING A STANDARD SET OF FLEXHOUSING/HEALTHY HOUSING FLOOR PLANS FOR USE BY NON-PROFIT HOME BUILDERS

This project will result in standard housing plans, construction details and specifications useful in the factory production of affordable housing units by non-profit builders across Canada, such as Habitat for Humanity. The plans would consist of a series of interchangeable modules to be used in the production of multiple building types such as single-family homes, semi-detached, duplex, etc.

CMHC Project Officer : *Ed Nera*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31940200
STATUS : Ongoing

END OF OPERATING AGREEMENTS: CHALLENGES AND OPPORTUNITIES FOR HOUSING COOPERATIVES

The objective of this External Research Program project is to encourage and support high quality innovative research by Canadian researchers in the private and non-profit sectors by exploring the challenges and opportunities of cooperative housing.

CMHC Project Officer : *Jean Gratton*	***CIDN*** : 28370219
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

HOME OWNERSHIP

ASSESSMENT OF THE OUTCOMES FOR HABITAT FOR HUMANITY HOME BUYERS

Habitat for Humanity Canada (HFHC) provides homes in partnership with low income families. Participants must contribute sweat equity, either in the construction of their own home or through other tasks required by the organization. They are also responsible for making monthly payments on an interest free mortgage used to finance the cost of the property; their payment is based on 25% of their income. The intention of using this process is for homeowners to feel they have earned their new accommodation, rather than being given it (a hand up, not a handout) as well as providing funds for the construction of more homes as the mortgage loans are repaid. There are currently approximately 600 households who have moved into homes built or renovated by HFHC in Canada.

While some research has been done regarding outcomes for families in the US who have moved into Habitat housing, there has been no rigorous analysis of impacts of stable affordable housing for Canadian Habitat families. As well, HFHC is interested in evaluating and improving the process used to prepare prospective homeowners for the responsibilities involved in owning a home.

The goals for this study were:

1. To examine how access to a stable home ownership environment has changed outcomes for families who have been participants in the HFHC program in Canada.

2. To assess and suggest improvements to the partnership aspects of the HFHC program; how well does the partnership process between the affiliate and the applicant prepare families for home ownership?

3. To assess how the financial well being of a Habitat household changes over time after occupation of their home.

Interviewees were asked about two main issues: how their lives had changed since moving into their new homes and how the counselling/partnering process worked for them in moving into their homes. A significant portion of homeowners reported improvements in their children's' grades and/or behaviour since moving. In some cases this was attributed to improved housing conditions such as greater space and more private space for each child. Some adults had returned to school since moving (30% of these to university or college) in order to improve their future job prospects; some already had better jobs since moving.

The counselling/partnering process was considered very valuable by the interviewees and most Habitat partners received very high ratings. Positive responses were linked to providing good information in a timely manner and being friendly. A good partner, who responded quickly to questions and concerns raised by the homeowner during the process, greatly helped to relieve the stress involved in taking on homeownership responsibilities.

The findings indicate that, while there is some room for improvement in certain areas, the Habitat program is generally working extremely well. Households are chosen for the program with the expectation that they can succeed at homeownership. While respondents said that they have to budget very carefully for the costs involved, most are able to manage and are excited about the fact that they are investing in an asset.

Prepared by Maureen Crawfor and Jane Londerville. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Report)

Note: No. 04-024 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/assesement%20pages(W).pdf

ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES

This project's objective is to expand the current content of the Homeowner's Manual to reflect a wider range of current and past house construction systems and components and to enhance the Manual with additional features in order to increase its usefulness to home purchasers and its appeal to builders, realtors and home inspectors.

STATUS : Completed
AVAILABILITY : There will be no product for this project

ESTIMATING PRIVATE AND SOCIETAL HOMEOWNERSHIP COSTS AND BENEFITS IN CANADA

Support for homeownership is a public policy goal, but there are both private and societal costs and benefits associated with it. Private costs, in the absence of government intervention, are those accrued directly to the individual families, not society (e.g. payment of interest on mortgage). Societal costs, on the other hand, are those, in absence of government intervention, accrued to the individual families and society on an undivided basis (negative externality). Private benefits, in the absence of government intervention, are those accrued to individual families, not society (e.g. capital gain). Those accrued to the individual families and society on an undivided basis (positive externality) without government intervention are termed societal benefits. Since the distribution of homeownership costs and benefits varies by region, income and other socio-economic characteristics, the project estimates its private and societal impacts in selected Canadian cities including Vancouver, Calgary, Winnipeg, Toronto, Montreal and Halifax.

CMHC Project Officer : *Jessica Yen*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26590200
STATUS : Ongoing

COST EFFECTIVENESS OF EVICTION PREVENTION PROGRAMS

This project will document and compare the costs to the tenant, the landlord and social services of a) eviction prevention in rental housing for those tenants who are at risk of eviction because of inability to pay the rent; b) the cost of re-housing homeless households; and c) the social consequences to evicted households. The methodology will include: a literature review, a non-exhaustive inventory of eviction prevention projects/programs in Canada; some interviews, analysis of alternative financial scenarios and case studies; and analysis and conclusion.

CMHC Project Officer : *Anna Lenk*　　***CIDN*** : 26760200

Division : Policy and Research Division　　***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

DEVELOPING A METHODOLOGY FOR TRACKING PERSONS WHO ARE HOMELESS OVER TIME: FINAL REPORT

The Panel Study on Homelessness in Ottawa is the first Canadian attempt to follow a cohort of homeless persons over time. The research objective for the first wave of the study was to interview a representative sample of current residents of Ottawa emergency shelters in order to gather descriptive data on demographic characteristics, housing history, health status, and health and social service utilization. The ultimate goal of the study is to identify and explain factors that distinguish individuals who escape homelessness from those who remain homeless or who experience multiple episodes of homelessness. This research project is using the panel study to develop and empirically validate a methodology for locating as many participants as possible over time. Based on a review of the relevant literature, a tracking protocol was developed for the project.

The tracking process began at the time of the initial interview. Participants were asked to provide consent to contact individuals and/or agencies with whom they were likely to be in contact in one year's time. As much information as possible was gathered to facilitate finding these contacts, which included friends, family members, service providers, hospitals and shelters. Participants were also asked to provide consent for the researchers to contact the City of Ottawa Employment and Financial Assistance (EFA) data base, through which all social benefits are distributed, to search for addresses and phone numbers of participants.

A total of 1,961 individual contacts were made to locate the 416 original study participants during the course of the project and 63% of the study participants were located. The success rate ranged from 73% for the male youth to 52% for the male adults. Family and friends were the most effective contacts in our efforts to reach female youth, and family and shelter contacts were the most effective means of reaching male youth. For all the other subgroups, the EFA data base at the City of Ottawa yielded significantly more accurate information than any of the other contacts.

Based on the lessons learned during the course of the project, a number of recommendations are provided relating to consent forms, soliciting participants' assistance, centralized administration of tracking and the necessity of adopting different strategies for different populations.

Prepared by: Tim Aubry, Fran Klodawsky, Elizabeth Hay, Rebecca Nemiroff, and Sophie Hyman, Faculty of Social Sciences, University of Ottawa. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2004. 33 pages

Note: No. 04-035 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Developing_Methodology(W).pdf

EXPLORATORY LONGITUDINAL STUDY ON EXITS AND RETURNS TO HOMELESSNESS IN WINDSOR

The research is based on a longitudinal survey of 120 homeless adults in Windsor. The study will examine:

1. what factors are associated with exits from homelessness into housing;
2. what dynamics are at play during periods of being housed;
3. what factors are associated with returns to homelessness for those that become homeless again;
4. the in-depth experiences of a subset of those who experience such exits and returns to homelessness; and
5. an appropriate longitudinal methodology that can track and follow people who are homeless.

The participants will be interviewed at three points in time: at baseline, 1 year after the baseline survey and 2 years after the baseline survey. To be included in the baseline survey, an individual would have slept on the streets (including other unconventional sleeping places like car, abandoned building), in a shelter, in doubled-up housing where no rent is paid, or in a hotel or motel within the last thirty days before the baseline interview.

CMHC Project Officer : *Anna Lenk* — ***CIDN*** : 28370202

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

HOMELESS APPLICANTS' ACCESS TO SOCIAL HOUSING

This project will investigate how social housing providers (public housing, non-profits and co-ops) currently accommodate homeless applicants (individuals and families), and how access could be improved. The research will take place in 3 phases: a) Literature review; b) Review of practices in Canada; c) Analysis and conclusions.

CMHC Project Officer : *Anna Lenk* — ***CIDN*** : 26560200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

HOUSING STABILITY VALIDITY STUDY: FINAL REPORT

The Housing Stability Validity Study is the third project of a series conducted by the Community Research, Planning and Evaluation Team at the Centre for Addiction and Mental Health. The purpose of this work has been to develop concepts, tools and methods for the planning and improvement of supportive housing programs for people with serious mental illness. This report describes the validation process of the Housing Stability Model, and benchmark evaluation procedure, developed in Toronto, Ontario through application to two other local housing systems in Canada: Ottawa and Halifax.

The Community Research, Planning and Evaluation Team formed partnerships with two agencies in each city. Each partner and local steering committee participated in a benchmark evaluation procedure. Following this process, participants were asked to describe the usefulness and applicability of the model, benchmarking evaluation procedure, and recommended practices.

Through this collaborative process, the study team and participants were able to learn about the local mental health housing systems from a myriad of perspectives, and assess the extent to which the concepts and methodologies developed in one housing system in Canada are applicable to two other jurisdictions. Steering Committees also discussed the implications that noted gaps and overlaps in housing and support service delivery have on strategic directions and next steps.

Prepared by the Community Research, Planning and Evaluation Team, Community Support and Research Unit, Centre for Addiction and Mental Health. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Research Report). 54 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Housing_Stability(w).pdf

STABLE HOUSING FOR SUBSTANCE USERS (DRUG AND ALCOHOL): LESSONS FOR HOUSING PROVIDERS

This project is intended to be an investigation of innovative or alternative residential or housing programs for persons who are homeless or at risk of homelessness and are substance users. The research will include case studies of programs and service providers who consider their housing or residential facility as one which makes use of the harm reduction philosophy or approach, or are contemplating a modification of existing conventional approaches or creating new programs in this regard. The research should answer the question as to which housing interventions and which factors most effectively help homeless persons with addictions to access and, more importantly, maintain stable housing.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26770200
STATUS : Ongoing

TRANSFERABILITY OF THE SAFE IN THE CITY APPROACH TO YOUTH HOMELESSNESS PREVENTION IN CANADA

This External Research Program project is an analysis of the implementation of a British youth homelessness prevention program, "Safe in the City", and identification of the means and obstacles to adapting a similar model in Canada. The study objectives include an examination of: the partnership arrangements undertaken by Safe in the City and the borough agencies, the reasons why partners have become involved in the initiative, the roles that each plays, and the structure of the partnerships; the transferability of the Safe in the City approach to the Canadian context; and what factors support and impede such an approach.

CMHC Project Officer : *Anna Lenk*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370214
STATUS : Ongoing
NEW

TRANSITIONAL HOUSING: OBJECTIVES, INDICATORS OF SUCCESS, AND OUTCOMES: FINAL REPORT

Some homeless adults, youth, and families require support as well as housing to stabilize their lives, perhaps due to histories of abusive treatment, addictions, mental health problems, or lack of employment skills. Transitional housing is intended to offer a supportive living environment and tools and opportunities for social and skills development. The overall objective of transitional housing is to provide people with the structure and support they need to address critical issues necessary to maintain permanent housing and maximize self-sufficiency. At a minimum, it is hoped that program 'graduates' will not use the emergency shelter system or become homeless again. Several federal government programs are funding the development of new transitional housing projects to address homelessness, but there is little research that assesses the effectiveness of this model.

This report is based on a review of the literature focused on the program objectives, indicators of success, and outcomes of transitional housing, as well as nine case studies. Appended to the report is a partial inventory of more than 75 transitional housing projects across Canada.

Prepared by Sylvia Novac, Joyce Brown, and Carmen Bourbonnais. CMHC Project Office: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2004. 111 pages

Note: No. 04-017 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Transitional%20HousingEN2(w).pdf

HOUSE CONSTRUCTION INDUSTRY

INDUSTRY PROFILE: CANADIAN LIGHTWEIGHT STEEL FRAME RESIDENTIAL BUILDING INDUSTRY

"Lightweight steel framing" is a name used to define a class of products manufactured from sheet steel that is formed to shape at room temperature (cold formed). The most common LSF shapes are C-sections used as wall studs, floor joists and roof rafters. As structural framing members, LSF sections are manufactured from sheet steel with specific properties and are engineered products.

Presented in this report is an overview of the Canadian light steel framing industry. This includes a description of the products currently in use, the common applications for these products, advantages, training requirements and a list of the current manufacturers. The intention is to give the reader a general understanding of the current Canadian industry, and identify companies that may be possible exporters.

Prepared by L. Xu, Canadian Cold Formed Steel Research Group, University of Waterloo. CMHC Project Officers: Murray Rasmussen and Jorge A. Malisani. Ottawa: Canada Mortgage and Housing Corporation, CMHC International, 2002. 39 pages

STATUS : Completed Report

AVAILABILITY : On a loan basis from Canadian Housing Information Centre

INSURANCE IN RESIDENTIAL CONSTRUCTION: AN ENVIRONMENTAL SCAN: EXECUTIVE SUMMARY FINDINGS REPORT

In Canada, home builders acquire protection via various forms of insurance, including, among others, builders risk insurance, wrap-up general liability insurance and contractors comprehensive general liability insurance. Together, these types of coverage, whether purchased on a project-by-project or continuous basis, not only provide builders with protection for loss and liability throughout and following construction projects but also act as a means of securing the interests of financial stakeholders associated with the project(s).

This study was designed to satisfy the following key objectives:

- Develop an understanding of the issues surrounding builders risk insurance; and
- Develop an understanding of the issues surrounding post-construction liability insurance.

Primary research for this study consisted of conducting nationwide interviews of residential construction companies, insurance underwriters and brokers, and associations and lending organizations, while secondary research consisted of documentation and literature reviews of previously published articles, research and proprietary association and company materials.

According to the research conducted, the insurance market for all types of commercial coverage has hardened over the last three years. A "hard" market designates an environment characterized by rising prices and reductions in capacity to underwrite insurance. The market has reacted to the events of September 11, reductions in reinsurance capacity, poor underwriting results and a difficult investment climate. The insurance industry's appetite for insuring residential construction projects has been particularly weak in response to widely publicized catastrophic fires at construction sites at several different locations across Canada and the emergence of new risks such as mold and terrorism. The insurance market for residential construction is contracting, with lower risk tolerance and fewer companies participating in the market.

Over the last three years, home builders have identified construction insurance as a critical problem area with reports of higher premiums and deductibles, reduced levels of coverage, new warranties and conditions attached to the policies, as well as refusals of coverage. These recent developments are a cause of concern in the housing industry with respect to the cost and availability of insurance. The cost of insurance ultimately affects housing affordability and the profitability of the home builders' business.

Prepared by Deloitte & Touche. CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation, 2004 (Housing Affordability and Finance Series) 51 pages

Order number 63425

Nota : Aussi disponible en français sous le titre : L'assurance dans le secteur de la construction résidentielle : une analyse de l'environnement : rapport sommaire sur les constatations

Note: No. 04-013 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and https://www.cmhc-schl.gc.ca:50104/b2c/b2c/mimes/pdf/63425.pdf

HOUSE CONSTRUCTION INDUSTRY

SKILLED CONSTRUCTION LABOUR SEGMENTATION

The purpose of this project is to document the material labour similarities and differences amongst residential construction, commercial construction (e.g. retail establishments), institutional construction (e.g. hospitals, schools), industrial construction (e.g. factories) and public works (e.g. roads, bridges), where residential construction would be divided into single-family, multi-family low rise and high-rise. This research will be carried out using, for example, information from the National Occupational Classification (NOC) data base.

CMHC Project Officer : *Bruno Duhamel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 27610200
STATUS : Ongoing

NOTE: See also p. 49-50

HOUSING

EXAMINATION OF THE BOUNDARIES BETWEEN HOUSING AND INCOME SECURITY POLICY

The result of this study will increase awareness of the importance of housing in respect to broader social policy and income support policy in particular. This will contribute to the work of the Federal-Provincial-Territorial working group on affordable market housing, and potentially to other exercises such as the development of a market basket for measuring poverty and the design of future income support policy (e.g. National Child Benefit). This study will compare the housing and income support systems in four countries (Canada, United States, United Kingdom and Australia). It will focus on the structure of housing.

CMHC Project Officer : *Brian Davidson*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30140200
STATUS : Ongoing

FILTERING IN HOUSING IN CANADA

Downward filtering is a process where housing stock, as it deteriorates and becomes less expensive over time, passes from higher income households to lower income households. Gentrification is the reverse of downward filtering; it is a process by which higher income households displace lower income households in existing neighbourhoods, which results in housing price increases. The objective of this project is to determine the extent to which (i) filtering in housing (rental and owner-occupied housing) and (ii) gentrification has occurred in Canadian cities.

CMHC Project Officer : *Jessica Yen*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30130200
STATUS : Ongoing

INDIVIDUALIZATION OF BEHAVIOURS AND LIVING OPTIONS

The research project will achieve the following objectives:

- Enhance the knowledge of one-person households, by developing dominant socio-economic profiles of one-person households in the Montréal CMA.
- Determine, through a comparative analysis with Toronto and Vancouver, if the predominance of households of this type in Montréal results from a cultural phenomenon or a market structure specific to the Montréal area.
- Identify, by means of a telephone survey, the housing needs of one-person households.
- Indicate, on the basis of different dominant one-person household profiles, the major residential paths that could arise in the future.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 28370206
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

TRENDS AND CONDITIONS IN CENSUS METROPOLITAN AREAS - EVOLVING HOUSING CONDITIONS IN CANADA'S CENSUS METROPOLITAN AREAS, 1991-2001

As part of the federal government's dialogue on the opportunities and challenges facing urban areas, Statistics Canada has been asked to undertake a project that would provide key background information on the trends and conditions in Canadian CMAs across a number of dimensions. As part of this initiative, CMHC's authoritative CMA report examines and analyses: demographic and housing market trends; the evolution of housing conditions; housing need; households at high risk of housing need; the distribution of housing need on evolving housing trends and conditions in census metropolitan areas. Included in the report is an extensive roster of detailed statistical tables supporting the analysis and conclusions.

CMHC Project Officer : *John E Engeland* ***CIDN*** : 28510200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

VALUE-BASED APPROACH TO MARKETING IN THE HOUSING SECTOR: THE MEANS-END CHAIN MODEL

The principal objective of this project is to improve our knowledge of means-end chains among home buyers. This will result in a new way of developing marketing strategies adapted to housing. While this first application is for local use, it could subsequently serve promotional efforts on foreign markets.

CMHC Project Officer : *Bruno Duhamel* ***CIDN*** : 28370212
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

CAPACITY DEVELOPMENT TRAINING FOR SEED FUNDING GROUPS

Community organizations that form for the purposes of developing affordable housing in their community often have no previous housing development experience. CMHC will deliver capacity development training sessions to provide these groups with information and tips to help them meet the many requirements of the development process, and project management. This training will be provided by the five CMHC regions in major locations across the country. The training is in three parts: Part 1 Organizational Development; Part 2 Housing Project Development - Financing and Construction; and Part 3 Project Management.

CMHC Project Officer : *Debra L Wright* ***CIDN*** : 29461500
Division : Assisted Housing Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DEVELOPMENT OF URBAN RESEARCH PROPOSALS

The purpose of this project is to develop a proposal to research (i) the impacts of housing affordability on labour mobility; and (ii) the consequential impacts of labour mobility on the economy. The scope of labour mobility shall be broadly defined.

CMHC Project Officer : *Eric Tsang* ***CIDN*** : 29090600
Division : Vice-President ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RECYCLING CATHOLIC CONVENTS AND RELIGIOUS INSTITUTIONAL BUILDINGS INTO AFFORDABLE AND ALTERNATIVE HOUSING: THREE CASE STUDIES

This project under the External Research Program will examine the recycling of religious institutional buildings in Quebec City into housing. An inventory of buildings that have been converted will be prepared and three case studies will be analyzed. Interviews will be conducted with the architects, municipal planners, occupants of the buildings and members of the religious order to assess the success of the housing project. Recommendations will be provided for future conversions of similar buildings.

CMHC Project Officer : *Susan Fisher* ***CIDN*** : 26470205
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RELATIONSHIP BETWEEN HOUSING CONDITIONS AND WEALTH

The objective of this research is to analyze data from Statistics Canada's 1999 Survey of Financial Security to explore the relationship between housing conditions and wealth with a view to examining the net worth, including assets and debts, of households above and below the housing affordability standard.

CMHC Project Officer : *Roger D Lewis* ***CIDN*** : 28250200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOUSING AFFORDABILITY

SCIP WEB SITE FOR PUBLIC RELEASE

The purpose of this research is to revise the content of the prototype dynamic SCIP web site and complete preparation of the changed nature of the SCIP web site to be more of a static as opposed to dynamic web site with SCIP serving as a comprehensive reference site on indicator development, documentation and use on Environment Canada's web site to assist municipalities establishing, developing and monitoring their own sustainable communities indicators programs.

STATUS : Completed

AVAILABILITY : Product is available on the web

ZONING AND AFFORDABLE HOUSING: A CRITICAL REVIEW OF THE GLAESER AND GYOURKO PAPER

The purpose of this project is to undertake a critical analysis of the Glaeser and Gyourko paper "The Impact of Zoning on Housing Affordability". This analysis is composed of three components:

- Understand the place of the paper in the literature on land use regulation and determine the extent of the general usefulness of the theoretical model to understanding the relationship between all facets of affordability and government regulations on new housing construction;
- Address questions on the extent to which the results of the paper are a unique artefact of the authors' data, including replication of the authors' work with alternative measures of construction costs and land use regulation; and
- Define and address the policy questions in Canada using existing sources of data on housing and government regulation.

Through these components, the Contractor will assess the extent to which differences in house prices and housing affordability across Canada can be explained by land use regulations.

CMHC Project Officer : *Bruno duhamel*

CIDN : 28460200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOUSING AND IMMIGRATION

ADDRESSING DISTINCT HOUSING NEEDS: AN EVALUATION OF SENIORS' HOUSING IN THE SOUTH ASIAN COMMUNITY

This External Research Program project will examine the suitability and effectiveness of South Asian older adults' current housing options and support services by: 1) conducting a post-occupancy evaluation (a Post Occupancy Evaluation (POE) is research done to evaluate how well a built project implemented its goals and to fine-tune the building's performance) with South Asian residents in a seniors' housing project in Surrey, British Columbia; and 2) comparing these findings with housing conditions and the availability of support services for community-dwelling South Asian older adults in the Greater Vancouver Regional District (GVRD).

CMHC Project Officer : *Jim Zamprelli*

CIDN : 26470215

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

LONGITUDINAL SURVEY OF IMMIGRANTS TO CANADA (LSIC)- DATA ANALYSIS OF HOUSING RELATED INFORMATION

This project is a continuation of CMHC efforts to investigate the role of housing and communities as an integrative tool for newcomers, their effects on the housing market, and barriers to their accessing adequate shelter. Research and analysis of the Census and LSIC data will focus on housing needs and preferences, housing conditions, living arrangements, household formation, and housing experiences and histories of newcomers as they evolve towards achieving the goal of integration. Barriers, obstacles and success in the housing market will be examined. This project is a co-venture between CMHC, three Metropolis Centres of Excellence and the National Secretariat on Homelessness.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 31920200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

METROPOLIS - CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues through a network of research centres in Canadian universities (Centres of Excellence). The results of the research will be used for the assessment of and development of policies and programs affecting immigrants and new Canadians. As an example, CMHC should benefit from research to be undertaken by the Centres in such areas as:

1. the effect of immigration on housing markets, demand and supply;
2. the effect of immigration on urban development, including issues of renewal of the urban core;
3. the impact of immigration on housing need, affordability, homelessness and the demand for social housing;
4. the social and spatial mobility of immigrants as compared with the profiles of the Canadian-born;
5. the relationship between immigration and the formation of ethnic, cultural or religious enclaves; the dynamics of enclaves - their role in integration (bridging or isolating), their economic role, their effect on city life, on urban renewal, on public safety, and so forth;
6. the relationship between metropolitan infrastructure (the quantity, quality and distribution of housing and public space) and immigrant integration.

Information on Metropolis and on close to 200 funded research projects can be found at www.canada.metropolis.net

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 25640200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

REFUGEE HOUSING INFORMATION NEEDS: RESEARCH CONDUCTED IN THE REGION OF NIAGARA

The Peace Bridge between Canada and the United States at Fort Erie, Ont. is Canada's highest volume entry point for refugees seeking asylum in Canada. Since 2000, an average of more than 5,000 refugees per year have entered the country at Fort Erie, with a peak in 2001 of 7,070, the largest number at any point of entry in Canada. Since 1998, the number of refugees entering Canada at Fort Erie has climbed by approximately 400 per cent, compared to a Canada-wide increase of about 60 per cent.

The increase has put tremendous pressure on the demand for low-cost rental housing in the region. The four objectives of this research were: to identify the current housing situation of refugees who choose to stay in the Niagara region (Fort Erie, Welland, St. Catharines and Niagara Falls), the housing options available to them, their housing information needs, and how these needs can be met.

HOUSING AND IMMIGRATION

Prepared by David Redmond and Associates. CMHC Project Officer: Judith L. Binder. Ottawa: Canada Mortgage and Housing Corporation, 2004. 60 pages

Note: No. 04-025 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

HOUSING AND TAXATION

ASSESSMENT OF A LOW INCOME HOUSING TAX CREDIT PROGRAM FOR CANADA

The first objective of this study is to develop alternative design options for the Low Income Housing Tax Credit Program (LIHTC) in Canada. These include the US LIHTC as the base option. Canadians have the immense advantage of being able to learn from the US experience and to make changes to the LIHTC, in light of US evidence. More important, changes to the design of the US LIHTC would be needed to adapt it to the Canadian context, for the income tax treatment of rental real estate, the social housing environment and the structure of the real estate development industry. The second objective is to assess from a qualitative perspective, and when possible from an empirical perspective, the impacts and ultimate viability of each design and its implications, especially for government costs. This project report should be available in early 2005.

CMHC Project Officer : *Bruno Duhamel*
CIDN : 26470206
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING EXPORT OPPORTUNITIES

BUILDING REGULATIONS IN ICELAND

Iceland represents a small but promising niche market for Canadian housing exporters. The Icelandic housing market, currently at 1400 starts per year, is expanding due to a strong economy and new industrial developments in the east. Virtually all building materials in Iceland must be imported and housing costs are high, making Canadian products quite competitive. Interest in wood frame construction is growing. Although the regulatory environment is quite conservative, most Canadian systems and products can be accepted. This bulletin summarizes the regulatory requirements related to imported housing.

Ottawa: CMHC International, 2003. 7 pages

Nota : Aussi disponible en français sous le titre : Règlement de construction en Islande

STATUS : Completed Report
AVAILABILITY : CMHC Web site at:
http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_018.cfm

CANADIAN EXPORTERS GUIDE TO U.S. RESIDENTIAL BUILDING CODES

For those Canadian firms that are contemplating the export of housing or housing components, the Unites States is a compelling market. It is close, it is familiar, it is big and it is rich.

It is also different. The United States has a wider range of climate zones and endures more extreme weather than does Canada - from the cold of the north, to the humidity and hurricanes of the south, to the heat and deserts of the southwest. In addition to the environmental challenges, there are code and regulatory issues for Canadians. There are five, major, building code models in active use across the U.S. at this time. In addition, there are a number of codes developed by individual states or by major cities. Also, each state and municipality may apply additional regulations and approval requirements to the adopted model code. So an exporter who wishes to market to more than a single state may have to meet the requirements of more than one code and each state's individual regulations and approvals may differ in detail even if they use the same code.

Further, each building code of itself is a large and complex document and a considerable effort is required to investigate and determine how the design and assembly of a house or a housing component may be required to adapt for compliance. For many Canadian housing manufacturers this neighbour to the south remains an uncertain and an unrealized market.

The purpose of this study is to help Canadian manufacturers of housing products gain an understanding of U.S. building codes and regulations for housing. The main focus is the International Residential Code (IRC), which is emerging as the prevailing standard for residential construction in the U.S. This study is also intended to provide a summary of the standards and approvals that may be required for code compliance of individual housing products in the United States.

This Guide is divided into six sections:

- Section 2 provides an overview of the different U.S. building codes and develops a rationale for focusing this work on the International Residential Code. Section 2 also provides a brief overview of some of the statistical characteristics of the U.S. housing market.
- Section 3 summarizes the key differences between the International Residential Code and the National Building Code of Canada. Section 3 also provides a brief summary of some of the differences between the IRC and the Uniform Building Code.
- Section 4 provides a review of U.S. Energy Codes (Model Energy Code and International Energy Conservaton Code) and the ENERGY STAR Program. It also provides a summary of several state code requirements of efficiency and ventilation.
- Section 5 provides a review of the Requirements for Manufactured Housing.
- Section 6 provides a summary of the standards and approvals that are required for selected housing products in the U.S.
- Section 7 provides a brief set of conclusions and lists the next steps a new exporter might take.

Prepared by Bruce Gough, Energy Building Group Ltd. CMHC Project Manager: Terry Robinson. Ottawa: CMHC International, 2003. 112 pages

Nota : Aussi disponible en français sous le titre : Guide des codes de construction résidentiels des États-Unis à l'intention des exportateurs canadiens

STATUS : Completed Report

AVAILABILITY : CMHC web site at:
http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/index.cfm

CANADIAN INDUSTRY IN THE AREA OF SENIORS HOUSING IN TOKAI REGION, JAPAN

This project's purpose is to conduct research/analysis on export opportunities for Canadian industry in the area of seniors housing in Tokai region, Japan.

CMHC Project Officer : Laura Diakiw
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : 27350900
STATUS : Ongoing

CASE STUDIES ON WOOD-FRAME CONSTRUCTION IN RUSSIA

This project's objective is to carry out case studies on existing Canadian wood frame houses in the cities of Omsk, Sakhalin, Rostov and Moscow in Russia to identify possible performance problems in their design and/or construction. The study will evaluate Russia's recently adopted Building Code for Single Family Houses and identify differences between this code and Part 9 of the Canadian code. In addition, the project will assess the extent to which the new Russian Building Code and regulations are available, understood, and enforced.

CMHC Project Officer : *Anand Mishra*
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : 30990900
STATUS : Ongoing

DEVELOPMENT OF CANADIAN LABELLING PROGRAM FOR CHILE

The Labelling program would provide foreign buyers with the assurance that the homes originated from Canada, were successfully certified, were adequately installed on-site to ensure expected system performance. The program will also offer training and after sales service support. On the other hand, Canadian participant members would benefit from a differentiation from the local and foreign competitors, an increased credibility based on the compliance to an independent quality control process which maximizes Canadian housing recognition and reputation abroad, and a protected trade mark, etc.

CMHC Project Officer : *Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : 28860900
STATUS : Ongoing

EXPORTING TO RUSSIA: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY PROJECT

The objectives of this project are:
-- to identify needs, challenges, and opportunities in the Russian housing market.;
-- to investigate the operational experience of Canadian housing exporters in Russia;
-- to identify export barriers, business opportunities and the challenges facing Canadian housing exporters in Russia;
-- to identify key success factors employed by Canadian housing exporters in Russia;
-- to assess the comparability between the requirements of the Russian housing market and the capabilities of the Canadian housing industry; and
-- to assess CMHC's past role in assisting the Canadian housing export industry to market effectively in Russia.

CMHC Project Officer : *Mietka Zieba*
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : 28030900
STATUS : Ongoing

GUIDE TO THE U.S. ENERGY STAR PROGRAM FOR CANADIAN HOUSING EXPORTERS

ENERGY STAR is a US national voluntary program for the labeling of energy efficient products. The purpose of this guide is to introduce exporters to the ENERGY STAR Program and to help guide those who may wish to apply the ENERGY STAR label to their export products. The major focus is upon the application of ENERGY STAR to new houses in the US. Other sections of the report review the requirements for other ENERGY STAR eligible housing products that may be exported to the US including windows and doors, heating and cooling equipment, and, reflective roof products. With the exception of houses, these products may also be labeled and marketed with the ENERGY STAR in Canada.

A major sub-objective of this work was to compare ENERGY STAR for Homes with Canadian building code requirements and with the R-2000 Standard which is the Canadian voluntary labeling program for efficient new houses. While ENERGY STAR for Homes differs from R-2000 there is an opportunity for exporters to transfer skills and knowledge from the Canadian experience to the US through ENERGY STAR.

A study was undertaken which compares the energy performance of a number of house plans built to the Canadian standards and using the ENERGY STAR rating software. The results of this study are attached to this report as Appendix A: Comparisons with Canadian Standards and an "ENERGY STAR Ready" Package. An "ENERGY STAR Ready" Package is recommended for exporters and the sensitivity of the performance rating of the package is examined in different locations across the US and through a series of changes to the specification.

Prepared by Bruce Gough, Energy Building Group Ltd. CMHC Project Manager: Terry Robinson. Ottawa: CMHC International, c2004. 61 pages

Order number: 62398

Nota : Aussi disponible en français sous le titre : Guide sur le programme Energy Star des États-Unis à l'intention des exportateurs canadiens du secteur de l'habitation

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products and http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=68932

HOUSING CONSTRUCTION COST COMPARISON IN EXPORT MARKETS

To undertake research and report on the comparative cost of housing construction in export markets. Cost estimates were obtained for construction of a "typical" Canadian wood-frame house and the local traditional housing unit in twelve countries including Canada. The data enables cost comparisons at the whole house, building component and elemental levels. The data collection has been completed, results have been verified and the costing tables were finalized.

STATUS : Completed

AVAILABILITY : There will be no product for this project

HOUSING MARKET IN ICELAND

Canada Mortgage and Housing Corporation conducted a study on the Icelandic housing market and its opportunities for the Canadian housing industry. The project was done in partnership with the Canadian Embassy in Iceland. A local consulting firm was hired to undertake the research.

The study presents an overview of the country, some economic trends, key characteristics of the housing market, such as stock and demand, opportunities in the new housing sector, regulations and certification for buildings, and some business considerations for Canadian companies. Contact information is also listed for some key players in the industry, such as architects, contractors, consultants, and government agencies.

Overall, Iceland presents some small scale opportunities for Canadian wood frame housing. Climatic similarities with the east coast, high incomes and a tradition of imports among Icelanders play in favour of these opportunities. However, the market poses many challenges to Canadian exporters, among which are, for each house, a unique design and engineering testing for approval and strict fire resistance requirements.

Prepared for CMHC by: Linuhönnun HF Consulting Engineers. CMHC Project Officer: Marie-Hélène Pastor. Ottawa: CMHC International, 2003. 123 pages

STATUS : Completed Report

AVAILABILITY : CMHC Web site and CMHC International

IMPACT OF CHINA'S NEW ENERGY EFFICIENT BUILDING CODE/CANADIAN HI-RISE OPPORTUNITIES

A study that presents Canadian solutions to help China attain new energy efficiency goals for high-rise housing.

CMHC Project Officer : *Marion A Rasmussen*	***CIDN*** : 29220900
Division : CMHC International	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

INVESTIGATION OF THE DISTRIBUTION CHANNELS IN THE U.S. FOR FIVE PRODUCTS

To provide market intelligence on distribution channels for Canadian housing exporters, a study will be conducted. The study will investigate the best distribution channels and contacts for five products in five different States or areas. The US Team members selected the following products and states according to key clients needs. The States and regions are: Colorado, Michigan, New England States, New York State and Florida. The products are : 1) Doors & Windows; 2) Pre-Engineered and Panelized Products; 3) Cladding; 4) Heat & Ventilation Systems (HVAC and HRV) and 5) Architectural Millwork.

CMHC Project Officer : *Marie-Hélène Pastor*	***CIDN*** : 31150900
Division : CMHC International	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

MARKET FOR CANADIAN BUILDING PRODUCTS IN THE GREATER CHICAGOLAND AREA 2003

This study covers recent changes, trends and opportunities for Canadian building products in the greater Chicagoland Area. The greater Chicagoland area is defined by 9 counties with a population of around 8.2 million people.

Prepared by Susan Roberts, Executive Supports Inc. CMHC Project Manager: Tulio Conejeros. Ottawa: CMHC International, 2003. 21 pages

Nota : Aussi disponible en français sous le titre : Le marché des matériaux de construction canadiens dans la grande région de Chicago 2003

STATUS : Completed Report

AVAILABILITY : CMHC web site at:
http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/index.cfm

PRODUCT CERTIFICATION ROADMAP

A product certification roadmap will be developed which will provide key Chinese approval agency contacts and procedures for selected product categories. Practical advice for product certification will be included.

CMHC Project Officer : Terry Robinson

CIDN : N/A

Division : CMHC International

STATUS : Ongoing

AVAILABILITY : Product is not yet available

ROADMAP TO PRODUCT APPROVALS IN RUSSIA

The study will address the following issues and information needs: the degree to which certification is mandatory, relationships between product certification and building products, alternate routes for local and national approvals, the respective roles of competing Russian agencies and jurisdictions, identification of key contacts within these agencies, the acceptability of Canadian standards and test data. For the specific product categories to be studied in detail, additional information will be collected on technical requirements, relevant Russian or international standards, etc.

CMHC Project Officer : *Mietka Zieba*

CIDN : 28880900

Division : CMHC International

STATUS : Ongoing

AVAILABILITY : Product is not yet available

STUDY TO IDENTIFY THE CHANGES HAPPENING TO THE JAPANESE BUILDING REGULATIONS AND ITS IMPACTS ON CANADIAN INDUSTRY ACTIVE IN JAPAN

A document will be produced in English to be distributed to Canadian housing suppliers of products and systems. The document will outline a path by which Canadian housing industry can follow to meet current changes happening in the regulatory environment which will assist sustaining and expanding market share. The document will provide an overview of legislation and regulations that guide the building industry in Japan; describe type approvals and product specific approvals and what they mean and in which cases they can be used; describe the various testing and approval facilities etc.

CMHC Project Officer : *Laura Diakiw*

CIDN : 27380906

Division : CMHC International

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SUPPORT TO PREFAB AND ENGINEERED WOOD INDUSTRY

CMHC wishes to offer business opportunities to Canadian exporters of prefab houses, multi-family projects and value-added components, including advice on distribution networks. To attain its objectives, CMHC must conduct research with the assistance of an American consultant specializing in this area. The main goal of this study is to contribute to increasing Canadian exports of residential construction products by identifying the best business opportunities, while emphasizing the competitive benefits of the products.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 31240900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UK HOUSING MARKET 2003

Canada Mortgage and Housing Corporation completed this study on the United Kingdom housing market, in partnership with the Canadian High Commission in London and a local consulting firm.

The study explores many key aspects of the UK housing market and its opportunities for wood frame construction and for specific building products. It provides an in-depth understanding of the market and recommends export strategies for the Canadian housing industry. The report should be read by those interested in learning about the possibilities and challenges of the UK housing market for manufactured homes and housing components, windows, doors, heating and ventilation systems, wood flooring, kitchen cabinets, roofing, cladding, and engineered wood products.

The report first presents a brief economic and demographic overview of the country and key characteristics of the housing market, such as stock, demand, and supply. It is followed by a detailed analysis for wood frame construction and for the specific eight products listed above. For each of these products, the study examines market size, prices, regulatory issues, design issues, distribution, training issues, trade barriers, export opportunities, and entry strategies for Canadian suppliers. Contact information for key players in the industry is also provided, for example, builders, housing associations, homes and building product manufacturers and associations.

Prepared by Lychgate Projects Ltd. CMHC Project Officer: Roger Leger. Ottawa: CMHC International, 2003. 82 pages

Nota : Aussi disponible en français sous le titre : Le marché de l'habitation au Royaume-Uni 2003

STATUS : Completed Report
AVAILABILITY : CMHC International and on the Internet at:
http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/index.cfm

UNITED KINGDOM AND IRELAND: RESEARCH PROJECT TO PROVIDE SUPPORT TO THE CANADIAN HOUSING INDUSTRY

This is a 10-month pilot initiative based on learned results from the 2002 Pilot Project which planned to identify and research United Kingdom-based housing partners, agents and representatives, match them with Canadian housing firms and disseminate the acquired market intelligence within the Canadian housing industry. That project confirmed the need to better align our market entry strategies with the UK market structure. Accordingly, two separate programs will be run, one for systems manufacturers and one for product manufacturers and two independent consultants will be engaged.

CMHC Project Officer : *Eliska Jerzabek* ***CIDN*** : 31210900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOUSE PRICES, BORROWING AGAINST HOME EQUITY, AND CONSUMER EXPENDITURES

This paper examines the link between house prices, borrowing against home equity, and consumer spending in Canada in recent years. Borrowing against home equity, or home equity withdrawal, means turning home equity into financial capital through borrowing, without selling the home.

The main objectives of this research project were to investigate the different sources of data on refinancing in Canada and examine the effect of changes in house prices on consumer expenditures through borrowing against home equity and in total, through the wealth effect. The study concludes that borrowing against home equity is more common than it used to be, both through refinancing of mortgages with a cash-out and through home equity loans and lines of credit. The paper presents two estimates of borrowing against home equity that have been produced in Canada. However, it found that they do not agree.

The paper highlights the lack of data and inconclusive econometric work to date to measure the size and significance of home equity borrowing in Canada. It considers how home equity withdrawal can be monitored and analyzed and underlines that further analysis of the link between house prices and consumer expenditures through borrowing against home equity is not possible without more information through surveys and enhanced reporting by financial institutions.

Prepared by Informetrica Limited. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2003. 35 pages

Note: No. 04-006 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR_House_Prices(w).pdf

IMPACT OF THE 1988 BASEL CAPITAL ACCORD AND PROGNOSIS FOR THE FUTURE

The research consists of a comprehensive review of over two hundred papers focusing on the impact of Basel 1988. Of the twenty-three potential impacts which served as the basis for conducting the review, it is possible to address ten through the available literature. These are segmented into general market and mortgage market impacts.

This literature review will help establish a baseline for understanding the potential impacts of the proposed revisions to Basel 1988 (thereafter called Basel II) on the capital market in general, and on the housing finance sector in particular.

STATUS : Completed Research Highlight

AVAILABILITY : No. 04-020 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

HOUSING FINANCE

UNDERSTANDING THE RISK-BASED PRICING APPROACH

This study will undertake a comparative analysis of risk-based and non-risk-based pricing of loans (including mortgages) as well as related securities and derivatives, with a view to understanding the relative benefits, costs and implications, both public and private. It will document the use of risk-based pricing of loans as well as related securities and derivatives in Canada and the United States, with a view to commenting on the possibility of risk-based pricing substituting non-risk-based pricing in the long-run. Last but not least, the study aims to identify the potential impacts of the proposed revisions to the 1988 Basel Capital Accord (Basel II) on the development of risk-based pricing of loans (including mortgages) as well as related securities and derivatives.

CMHC Project Officer : *Bruno Duhamel* — ***CIDN*** : 31390200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

HOUSING FORECASTING AND DEMAND

COHORT ANALYSIS OF CANADIAN HOUSING TRENDS

This External Research Project will use cohort data to explore the housing careers of Canadians living in all regions of the country and born between 1905 and 1974. The objectives of the work are to examine how the housing careers of birth cohorts differ from that which might be deduced from cross-sectional data, to identify differences among cohorts, and to relate the housing careers of cohorts to the socio-economic conditions they have experienced. The analysis should provide insights into the viability of forecasting future behaviour of households using different types of data; for example, it could be that cohort data will suggest different implications for housing choices in the future than cross-sectional data.

CMHC Project Officer : *Roger D Lewis* — ***CIDN*** : N/A

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

HOUSING INDICATORS AND DATA

STRUCTURAL CHANGES IN MONTREAL AND OTHER MARKETS IN QUEBEC

The main objective of this project is to investigate whether Montreal has undergone some structural shifts by identifying the indicators of structural changes. This research will also provide a comparative analysis with markets (CMA's) in Quebec and in Canada that have gone through structural changes, by comparing the indicators of structural changes, the extent, the reasons, whether changes are temporary or permanent, future direction and implications of the changes.

CMHC Project Officer : *Bruno Duhamel* — ***CIDN*** : 28770200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

INCIDENCES DES TRANSFORMATIONS ETHNIQUES SUR LE MARCHÉ RÉSIDENTIEL DU QUARTIER RIVIÈRE-DES-PRAIRIES À MONTRÉAL

Like other Montreal districts, Rivière-des-Prairies has undergone significant ethno-demographic changes in recent decades. For this research, the Rivière-des-Prairies district was retained as a preferred area to observe and analyze the conditions in which persons of Haitian origin access the real estate market. The main objective of this research was to understand the conditions that may give rise to differential treatment and their impact on the extent to which buyers of Haitian origin access the real estate market. Assumptions regarding the increase/decrease in property values in Rivière-des-Prairies as advanced by real estate agents, the geographical confinement to the district, differential treatment that could result in discrimination, and alternative financing options required by financial institutions were tested. The data showed that none of the assumptions could be verified completely. Slight variations, in both the practices and their effects, had to be made during the research to explain the different perceptions among the players. In a district where pluri-ethnic cohabitation has become the norm, the market segmentation of the real estate market certainly depends on factors such as cost and the ethno-cultural mix within many micro-spaces. Finally, certain types of testing, like the experiences in the United States, would precisely provide a better measurement of discrimination based on identity markers such as ethnic group, family status, gender or skin colour.

Prepared by Sylvie Paré. CMHC Project Officer: Kevin Hughes. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Research Report) 165 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/Incidences_FINAL(w)2.pdf

LITERATURE REVIEW OF SOCIO-ECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS: FINAL REPORT

The purpose of this report is to review and consolidate existing research regarding the impact of socio-economic trends on consumers and housing markets, discuss current thinking, identify research gaps and prioritize future research. The terms of reference for this report called for the inclusion of such topics as: the cost of housing and factors contributing to costs; tenure choice and consumer housing preferences; economic factors (such as employment, income, interest rates, inflation and taxation); demographic factors (such as aging, changes in households composition, immigration and migration); sustainable development and infrastructure needs; evidence of market failure; consumer environmental awareness; and land use planning (such as smart growth and growth management).

Because of the significant amounts of research already done on affordable housing, the scope of the study excludes information gaps and trends in relation to the need for and availability of affordable housing. It also excludes financial product and public policy development, since these topics are more thoroughly addressed through other CMHC research reports.

The report outlines the recent and future aspects of various trends, drawing on major findings in Australia, New Zealand, United Kingdom and Unites States where appropriate. A discussion of the regional and submarket variations within Canada of the various issues and trends is provided and the report identifies potential research priorities in Canada. The report also contains a full bibliography of all sources consulted.

Prepared by Rural and Small Town Programme, Mount Allison University and Institute of Urban Studies, University of Winnipeg. Principal Investigators: David Bruce and Tom Carter. Research Team: Ausra Burns, Jino Distasio, Jillian Golby. Ottawa: Canada Mortgage and Housing Corporation, 2003 (Housing Affordability and Finance Series) 115 pages

HOUSING MARKET

Order number 63411

Nota : Aussi disponible en français sous le titre : Analyse documentaire des tendances socioéconomiques influant sur les marchés de l'habitation et de la consommation

Note: No. 03-011 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed Report and Research Highlight

AVAILABILITY : CMHC Information Products

HOUSING RESEARCH

FEASIBILITY STUDY ON USE OF SOCIAL POLICY SIMULATION DATABASE AND MODEL (SPSD/M)

Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) is a tool designed to analyze the financial interactions of governments and individuals in Canada. It allows estimations of the cost implications or income redistributive effects of changes in personal taxation and cash transfer systems. The purpose of this project is to complete a feasibility study on use of Social Policy Simulation Model (SPSD/M) for housing specific policy and program development and evaluation.

STATUS : Completed

AVAILABILITY : There will be no product for this project

INTERNATIONAL COMPARISON OF HOUSING CONDITIONS INDICATORS

The underlying intent of the work is to describe the housing conditions indicators currently used for planning and policy purposes by the national governments of the United States, England, and Australia, and to compare these with the Canadian core housing need approach. It focuses primarily on the measures and norms used to assess housing conditions, but also compares the results of applying the indicators for a recent year, and discusses the strengths, weaknesses, and limitations of such a comparison. The results update and extend the 1992 work "A Comparison of Housing Needs Measures Used in Canada, the United States, and England" (CMHC Socio- Economic Research Highlight Issue 7). The results will be of interest to housing researchers at the federal, provincial, and municipal level, along with academics and any private / non-profit companies involved in measuring housing conditions.

Prepared by Steve Pomeroy, Focus Consulting Inc. in association with Tony Dalton, Michael Stegman, and Steve Wilcox. CMHC Project Officer: Lance Jakubec. Ottawa: Canada Mortgage and Housing Corporation, 2004. 82 pages

Note: No. 04-032 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Comparison(w).pdf

NOTE: See also p. 51

INFRASTRUCTURE

DEVELOPMENT OF COSTING MECHANISM(S) TO FACILITATE SUSTAINABLE COMMUNITY PLANNING

The purpose of the project is to develop a mechanism(s) that will allow community planners to effectively calculate and convey the full, accurate, long and short term public infrastructure costs of both conventional and more sustainable community planning scenarios. Phase 1 will identify relevant commercially available or partially developed infrastructure costing models and tools and community scenario building tools; identify current relevant sources of financial costing information related to the direct, indirect and external costs affected by development; document current costs for a full range of conventional and alternative infrastructure elements; identify the key costs affected by urban form and the factors that affect them most; apply the key costs to six development scenarios and develop cost/revenue statements for each scenario; construct a methodology to permit planners to effectively calculate and convey reliable net public cost projections for a full range of sustainable community planning scenarios; and if no tool currently exists, develop a framework for a methodology or tool by which the diverse sources and currently unrelated tools used above might be integrated into a single costing/scenario development exercise. Phase 2 of the project will involve the development of a costing scenario tool using the data collected in Phase 1.

CMHC Project Officer : *Cynthia Rattle*
CIDN : 26950200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SUSTAINABLE INFRASTRUCTURE AND URBAN ENVIRONMENT DISCUSSION PAPER

CMHC is participating with other Government of Canada departments in a Task Force on Urban Issues being led by Intergovernmental Affairs, Privy Council Office (PCO). The Task Force is undertaking a number of targeted research projects examining issues of interest in urban areas. This project will provide CMHC support for research into sustainable infrastructure and the urban environment. The PCO will engage Metropole Consultants to prepare a policy discussion paper for medium-term planning that approaches sustainable infrastructure and urban environment issues in an integrated and practical manner.

STATUS : Completed
AVAILABILITY : There will be no product for this project

PERSONS WITH DISABILITIES

COST BENEFIT OF RENOVATIONS TO ACCOMMODATE A DISABILITY

This research will investigate the types and costs of renovations that seniors and persons with disabilities have carried out in their home -both single family homes and apartments- to offset the effects of disability. It will also examine the potential impacts of the renovations on: a) occupants, in terms of helping them carry out activities of daily living, enhancing their independence, preventing them from moving out of their homes, etc.; b) home care workers, with respect to helping them do their jobs more efficiently, safer, more effectively, etc.; and c) agencies providing health and home care services, in terms of changes in the frequency or types of services required, ease of providing the services, cost, etc. The study will also examine the potential impact of home renovations, when combined with the necessary social, health and home care services, on the need for institutional care.

CMHC Project Officer : *Luis Rodriguez*
CIDN : 26800200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS

The objective of this External Research Program research is to determine the effort needed by adults and seniors to climb ramps using manual wheelchairs.

CMHC Project Officer : *Luis Rodriguez* **CIDN** : 23050200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RENOVATION OF HOME TO INCLUDE CEILING TRACK SYSTEM FOR PEOPLE WITH DISABILITIES

This project will determine best solutions to renovating homes to include a ceiling track system that allows a parent of a child or caretaker of an adult with a severe physical disability to move him/her from one room to another easily. The project will also determine how to reinforce ceilings in a home to support the installation of this type of system. Research will be conducted by visiting homes with this system in place, determine where difficulties exist and determining best solutions. This project will improve the renovations of homes using a ceiling track systems used for the transfer from one room to another of children and adults with severe physical disabilities.

CMHC Project Officer : *Collinda Joseph* **CIDN** : 31950200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

POPULATION HEALTH

FACILITATING OF STUDYING THE HEALTH EFFECTS OF CORE HOUSING NEED

This project is a feasibility study that would put together: 1) the ideas from the Framework Report, commissioned by the National Housing Research Committee 2) the recommendations for improved research, and 3) the opportunities and input generated by the Housing and Population Health Working Group of the National Housing Research Committee; and assess what could be achieved in practice at four levels of funding (to be decided by an Advisory Committee). The report on feasibility would be written up in a format easily transferable to the typical formats for an application for funding.

CMHC Project Officer : *Phil Deacon* **CIDN** : 31300200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP) EVALUATION = ÉVALUATION DU PROGRAMME D'AIDE À LA REMISE EN ÉTAT DES LOGEMENTS (PAREL)

The Residential Rehabilitation Assistance Program (RRAP) was introduced in 1973, with the On-reserve RRAP being introduced in 1978. Since then, the Program has provided $3.0 billion to help rehabilitate over 650,000 substandard housing units and beds. While RRAP has undergone numerous changes throughout its history, its prime intent to bring the housing conditions of low-income Canadians up to basic health and safety standards has remained unchanged.

This evaluation covers the period from 1995, when major program changes were last introduced, to 2001. Previous changes introduced in 1985 ensured that RRAP was targeted to households in core housing need, that is, households living in substandard housing who cannot afford adequate and suitable accommodation without paying more than 30% of their income on shelter. The 1995 changes were intended to improve the program's ability to address repair needs by increasing program assistance and improved targeting to households with greatest need.

In December 1999, the federal government announced a $311 million expansion to the RRAP and other federal renovation assistance programs as part of the $753 million National Homelessness Initiative.

This evaluation covers activity for the following program components: Homeowner RRAP, Rental RRAP, Rooming House RRAP, Conversion RRAP, RRAP for Persons with Disabilities and the Emergency Repair Program, as well as provincial and territorial programs cost-shared under RRAP. The evaluation also covers activity for the two components of the On-reserve RRAP, namely Homeowner RRAP and RRAP-D for Persons with Disabilities. In the case of Quebec, the evaluation relies on existing evaluations of Quebec programs carried out by la Société d'habitation du Québec. Two other renovation assistance programs, the Home Adaptations for Seniors' Independence program and the Shelter Enhancement Program have recently been evaluated and hence are not part of the current evaluation.

This evaluation addresses the following key questions: Is there a continuing rationale for federal government renovation assistance? Who benefits from renovation assistance? What are the housing impacts? What are the impacts on neighbourhoods and on employment? The evaluation also examines program design and delivery issues.

Prepared by Audit and Evaluation Services, Canada Mortgage and Housing Corporation, R. A. Malatest & Associates Limited, and Auguste Solutions and Associates Inc. Ottawa: CMHC, 2003. 1 CD-ROM Bilingual

STATUS : Completed CD-ROM

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_bilingual/Residential%20Rehabilitation%20Assistance%20Program%20Evaluation%20-%202003.pdf

NOTE: See also p. 60-61

HOUSING STABILITY INDICATORS AND IMPACTS

This External Research Program research initiative will survey between 700 and 1,000 renter households in Greater Vancouver to begin to develop a better understanding of the overall level of housing stability/instability that exists among renter households.

CMHC Project Officer : *John E Engeland*

CIDN : 25250212

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

ISSUES AND STRATEGIES FOR SHARED ACCOMMODATION

The research question is: Considering that sharing accommodation is a good economic strategy for low-income single tenants, what strategies could facilitate this housing arrangement? Within the larger research question, there are two objectives for this research:
1. For low-income single people who do not require supportive housing: identify barriers to shared housing, and strategies to successfully facilitate sharing in order to increase housing affordability.
2. For supportive housing providers and tenants: examine the factors which facilitate informal sharing, and identify (a) practices which could be adopted by supportive housing providers, and (b) factors which are difficult to replicate in supportive housing.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30320200
STATUS : Ongoing
NEW

STRATEGIES TO PRESERVE THE EXISTING RENTAL HOUSING STOCK IN GREATER VANCOUVER: FINAL REPORT

There is growing recognition of the need to preserve the existing rental housing stock in Greater Vancouver as this stock has a critical role to play in addressing the need for affordable housing.

This study identifies and considers a variety of tools that could be used to preserve the existing rental housing stock, and which of these would have the most potential for preserving the rental housing stock in Greater Vancouver. The range of tools includes:

- Planning and policy
- Standards of maintenance bylaws
- Conversion control
- Demolition policies
- Zoning: regulations and incentives
- Direct expenditure government programs
- Tax incentives
- Financing tools
- Acquisition and rehabilitation by municipalities and non-profit housing organizations
- Education and information

The method involved a focused literature search to identify tools and initiatives in the United States and Canada that are used to preserve the existing rental housing stock. In addition, a limited number of key informant interviews were conducted with local government staff in the U.S., (San Diego, Seattle and Portland), and with municipal planners, inspectors and landlords in Greater Vancouver. A workshop was also held with key stakeholders in Greater Vancouver.

In order to preserve rental housing in Greater Vancouver, this report recommends that all the tools identified in this study be considered as part of a comprehensive strategy to promote maintenance and the preservation of this housing. It is further recommended that all levels of government, the private sector and community agencies work together to implement a coordinated strategy to preserve this stock.

Prepared for the Tenants Rights Action Coalition by Deborah Kraus, Jim Woodward, Margaret Eberle and Dianna Hurford. CMHC Project Officer: Tan M. Crombie. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Report) 87 pages

Note: No. 04-026 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

ASSISTING THE CITY OF STRATFORD TO IMPLEMENT THE FUSED GRID CONCEPT

The purpose of this project was to assist the City of Stratford in assessing the benefits of using the Fused Grid planning concept. This assessment was done in the following steps: 1. Alternative plans were drawn for the area of the newly annexed lands. 2. The plans were analyzed for the following quantitative attributes: a) Length of streets; b) Total land area allocated to streets; c) Developable land area; d) Total open space; e) Traffic impact. 3. The plans were also analyzed for qualitative attributes such as connectivity, walkability, safety, tranquility, and delight. For these qualitative attributes measurable indicators were applied to evaluate performance. 4. The plans were evaluated for their impact on municipal capital expenditures and operation and maintenance expenditures with regard to infrastructure elements that are installed and maintained by the city. Following the presentation of the results of these analyses to the City, the planning committee and council selected the Fused Grid alternative, as adapted to the specific site constraints, as the official secondary plan for the annexed lands.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 28210200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CASE STUDIES OF SUSTAINABLE GREENFIELD RESIDENTIAL DEVELOPMENTS

The current approach to residential development that consumes open space on the urban fringe for single-detached dwellings on large lots is recognized as neither economically nor environmentally sustainable. This project is to document sustainable ("green") residential development case studies from across Canada so that developers, municipalities, housing professionals, and community groups can learn about success stories and replicate these "green" solutions, where applicable.

CMHC Project Officer : *Lance Jakubec* ***CIDN*** : 29490200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

WAVERLEY WEST KENASTON BOULEVARD ALIGNMENT OPTIONS STUDY

The purpose of this research was to assist the Manitoba Housing and Renewal Corporation and the City of Winnipeg in examining and implementing the fused grid planning model. A main goal of this work was to engage the industry in applying planning and design ideas that are intended to have positive impacts on the community and the environment. A subsidiary goal was to obtain sound research results which can demonstrate the validity of these ideas and their benefits to industry and community.

This report assesses the traffic performance of a number of options for route 90 (Kenaston Blvd) as it passes through a planned town centre in a new community in the southwest boundary of the city of Winnipeg. The first component of this research looked at a central element of the Fused Grid model, the twined arterial, as it applies to the planned new community. The traffic analysis shows that the twined option provides a better level of service than the conventional 6-lane express arterial road. Moreover, it would be more economical to build and would create a much friendlier pedestrian environment at the community, business and retail centre than the alternative.

Prepared by Stantec Consulting Ltd. Prepared for Manitoba Housing and Renewal Corporation. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2004. 28 pages

STATUS : Completed Report
AVAILABILITY : On a loan basis from Canadian Housing Information Centre

ADAPTING BUNGALOWS FOR SENIORS' HOME CARE: A POST-OCCUPANCY EVALUATION

This research project consists of a post-occupancy evaluation of suburban bungalows that were redesigned for seniors receiving health care services at home. This study aims for the production of an illustrated report compiling typical life stories, combining the day-to-day experiences of the seniors, the comments of the caregivers and the characteristics of the homes.

CMHC Project Officer : *Luis Rodriguez* ***CIDN*** : 26470210
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

COHABITATION INTERGÉNÉRATIONNELLE ET LOGEMENT SUPPLÉMENTAIRE DANS LES BANLIEUES DE QUÉBEC : PROJETS DE FAMILLES ET RÈGLES D'URBANISME

This research studied the addition of secondary suites—self-contained housing units adjacent to a single-family dwelling or constructed within it—for inter-generational home sharing in suburbs.

The research included a qualitative survey of urban planning managers in five suburban Québec municipalities to obtain information about municipal regulations and perceived benefits and drawbacks of secondary suite home sharing. Researchers also interviewed 36 people in 26 households, representing 15 families who are home sharing. The interviews collected information about attitudes, motivation, the steps taken toward home sharing, the difficulties faced and perceptions of benefits and drawbacks before and after deciding to home share.

The research shows that municipal zoning and architectural integration regulations are an important part of decision-making for households that wish to home share. Adding a secondary suite for relatives seems to be a choice for families with strong emotional bonds. Inter-generational home sharing is a joint decision and generally meets the expectations of the people involved. They see many benefits in terms of security, finances, sociability, daily life, the quality of the built environment, space and health. The most significant drawback is a potential loss of privacy and this can lead to friction if space for each household is not clearly defined. The research also notes that there are no public programs to finance secondary suites for inter-generational home sharing. The households involved pay the entire conversion costs.

Prepared by Manon Boulianne. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2004. 91 pages

Note: No. 04-028 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/
RR_Cohabitation_FR(w).pdf

DETERMINING THE IMPLICATIONS OF THE AGING OF THE CANADIAN POPULATION FOR HOUSING AND COMMUNITIES

The objective of this project is to examine the specific implications of the aging of the Canadian population for housing and communities. The research will be based on existing data and literature, new practical information from experts and key informants in communities, and case studies of communities that have already reached the proportions of seniors that Canada is expected to have over the next 30 years. The emphasis will be on identifying the challenges and opportunities for planning, designing and managing communities (i.e. cities, small towns and suburbs) with increasing older populations. While the project will deal with a range of issues, the main focus will be on urban form and housing. Other related issues, such as transportation, will have a secondary focus.

CMHC Project Officer : *Luis Rodriguez* ***CIDN*** : 27420200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF CURRICULA AND SEMINAR MODULES FOR NEW AND EXPANDED CONSTITUENCIES

The objective of this project is to examine the information needs of new audiences for the Seniors Seminars, e.g.:

- municipalities, at staff and political levels;
- Aboriginal communities;
- provincial and territorial governments whose growing population of seniors merit attention to design and living arrangements for this segment, and;
- seniors themselves.

It will develop a plan to produce curricula and training materials for new seminars. The project will include a feasibility study on delivery to the new audiences and identify strategies on marketing the seminars and securing delivery venues in partnership with these groups. This work will be coordinated with work in the project "Re-evaluation and Enhancement of Existing Senior Seminar Modules".

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 30370200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF TRAINING MODULES AND CURRICULUM ON HOUSING FOR SENIORS AND PEOPLE WITH DISABILITIES FOR THE ARCHITECTURAL PROFESSION AND EDUCATION INSTITUTIONS WITH CONSTRUCTION-RELATED PROGRAMS

The objective of this project is to identify the most effective techniques for the development and delivery of seminars on seniors' housing for architects, architectural technologists, and other building and design professionals.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 26780200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EXAMINATION OF LIFE LEASE HOUSING ISSUES

The primary objective of this project is to produce a comprehensive research report, which will provide the target audience - lenders, builders, developers and members of the non-profit and public sectors- with the information and guidance that they need to be able to respond appropriately to the various issues and concerns relating to life lease housing.

CMHC Project Officer : *Luis Rodriguez*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25200200
STATUS : Ongoing

HOME SELECTION GUIDE FOR THE 55+ MARKET

The objective is to produce a user-friendly guide document for use by Canadian housing consumers who are 55 years of age or older. The guide will be designed to help them assess their own housing situation; examine the types of solutions that can meet their needs and preferences; and identify the types of housing choices that are best for them.

CMHC Project Officer : *Luis Rodriguez*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25360200
STATUS : Ongoing

HOUSING OPTIONS STUDY FOR OLDER ADULTS IN THE REGION OF PEEL

The purpose of the research project is to gather data on housing preferences and needs of older adults in the Region of Peel aged 55 years and older. There are three main goals of the research project: 1) To develop, distribute and analyse responses to a survey that captures the key areas of information required; 2) To facilitate focus groups to obtain required housing needs and preference information; 3) To develop an appropriate approach to obtain required housing needs and preference information from older adults who are identified as being isolated.

CMHC Project Officer : *Brett C Barnes*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30390200
STATUS : Ongoing

LEGAL FRAMEWORK FOR SUPPORTIVE HOUSING

This project will review legislation applying to supportive housing for seniors and explore options for reform. The focus will be on legislation in British Columbia. The report resulting from the research should be useful to individuals and organizations involved in the development of supportive housing as well as policy makers.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 25250213
STATUS : Ongoing

LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES

The objective of this research is to gather and document the views and preferences of prospective elderly residents for two distinct types of accommodation models. One model being a combination of life leases and support services in a home like environment, and the other a traditional long term care facility. The analysis will be done both before and after occupancy.

CMHC Project Officer : *Luis Rodriguez* — ***CIDN*** : 24370201
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MARKET FOR SENIORS' HOUSING IN THE PRAIRIES

This project's objective is to investigate short-term to long-term demographic trends in the Prairies to determine the demand for senior housing. It will also evaluate the current supply of seniors' facilities, their location, costs and basic amenities.

CMHC Project Officer : *Brian Hollohan* — ***CIDN*** : 23031000
Division : Market Analysis Centre — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

PILOT IMPLEMENTATION AND DELIVERY OF REVISED SENIORS SEMINARS TO NEW AND EXPANDED AUDIENCES

This project flows from the key main objectives originally established for the Seniors Seminars project, i.e.

a) To increase awareness of CMHC as the Federal government's housing agency and as a major source in Canada of research and knowledge on seniors' housing issues;

b) To increase awareness in the community of the range and type of seniors' housing options that can be made available;

c) To heighten knowledge and take up of CMHC Assisted Housing Programs targeted to seniors and persons with disability (RRAP-D, HASI, Canadian Centre for Public-Private Partnerships in Housing).

The methodologies for meeting project objectives will be:

a- arranging pilot seminar venues and partnership agreements with host organizations;

b- promoting the pilot seminars, marketing to key client groups;

c- locating and engaging seminar presenters and animators, who will be both external contractors and CMHC personnel.

CMHC Project Officer : *Jim Zamprelli* — ***CIDN*** : 30380200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROJECTING THE HOUSING NEEDS OF AGING ATLANTIC CANADIANS

This research will examine the current housing and support service needs of Atlantic seniors at both the provincial and regional levels and, based on these, will generate new and valuable insights.

CMHC Project Officer : *Luis Rodriguez* — ***CIDN*** : 29520200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

RE-EVALUATION AND ENHANCEMENT OF EXISTING SENIOR SEMINAR MODULES

This project is intended to:

a) follow-up and action the evaluative comments and suggestions for enhancement to modules provided by seminar participants, by the team of presenters during the post-pilot phase debriefings and the retrospective observations made by the project consultant who provided feedback through the workshop evaluations done at most sessions;

b) integrate CMHC research results into the modules to make them more useful to expanded clients groups, especially those with more technical educational needs;

c) undertake objectives (a) and (b) in light of the findings, conclusions and recommendation expected to result from the project on consulting new and expanded constituencies.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 30360200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

RENOVATION AND REPAIR ADVISORY SERVICES FOR HOMEOWNERS/SENIORS

The final report resulting from this research will discuss renovation/repair advisory services for homeowners/seniors. Drawing from consultations with housing industry members from across Canada, and information gathered from other countries, particularly the U.S. and the UK, the report will identify benefits and drawbacks of developing a renovation/repair advisory service that could be modelled across Canada.

CMHC Project Officer : *Luis Rodriguez* ***CIDN*** : 26470203

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

SEMINARS ON SENIORS' HOUSING FOR THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors housing for professionals in the Canadian residential and home care sectors. The project was developed to disseminate the results of CMHC's research, programs and other relevant information concerning seniors housing.

This project entails eight separate modules on different aspects of seniors housing. By year-end 2003 some 35 seminars/presentations were delivered at over 24 events. Evaluation results indicate a very high degree of satisfaction with the seminars and participants indicated they have used or plan to use the information gained at these events. The seminars project is ongoing, with a focus on the health and home care industry, architects and home builders. New audiences will also be sought, e.g. seniors organizations.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 23820200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Seminar/training is available

SENIORS

SENIORS' HOUSING FOR SENIORS - A FEASIBILITY STUDY

The objective is to undertake a pilot study in the City of Ottawa to determine the interest of seniors (55+) who are owner occupiers in subdividing their housing units into multiple units and the feasibility (financially and architecturally) of doing so. The project is in line with the City's official plan to match housing developments with demographic requirements as well as to intensify and diversify residential development (Ottawa, 2003). The study also addresses the goal of Aging in Place (i.e., enabling seniors to remain independent in their homes for as long as possible). There are three basic research questions:

1) are senior owner occupiers interested in converting their single family homes into multiple units for their own use and the use of others including seniors?

2) among owner occupiers who are interested in conversion, what are the financial and architectural implications of conversion? and

3) what regulatory and zoning changes are required to accommodate the conversion of senior single family units into multiple units?

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370204
STATUS : Ongoing
NEW

SOCIAL HOUSING

SOCIAL HOUSING IN THE CONTEXT OF RURAL DEPOPULATION

Increasing numbers of public and social housing projects are located in areas of rural depopulation which are losing their service infrastructures. This results in housing projects being "stranded" in communities which are becoming service-poor. The people in the "stranded" projects are often seniors who must face decreasing access to necessary social and health services/facilities. This project would entail an assessment of the scope of the problem and include case studies of communities/social housing managers who have experimented with "best practices" in dealing with the challenge.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26570200
STATUS : Ongoing

SUSTAINING THE NON-PROFIT HOUSING SECTOR IN B.C.

The purpose of this project is to explore potential strategies for re-positioning or re-aligning the non-profit housing sector to better respond to current challenges. The nature and extent of current management problems will be determined, and attitudes towards a variety of administrative and management choices will be explored in depth.

CMHC Project Officer : *Stephen G Hall*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28700200
STATUS : Ongoing

COMMUNITY PLANNING AND DESIGN CHARRETTES

This project will contribute to design charrettes in several possible ways including participation in charrettes, financial support towards costs to retain a consultant or to cover logistical expenses.

A community planning and design charrette was held for the West Hills residential subdivision in the City of Fredericton, New Brunswick in July, 2004. The purpose of the charrette was to develop sustainable visions for the subdivision. CMHC provided financial support, engaged a consultant to plan, deliver and document the charrette, and participated in the charrette. Documentation of the results of the charrette is underway.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31740200
STATUS : Ongoing
NEW

IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to analyze demographic, housing, transportation and energy data and to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns. Users of this web based product will be able to select among five Canadian cities. In each city, five typical neighbourhood development patterns and locations within the urban context will be described, highlighting issues such as private vehicle use, access to daily destinations and availability of private space. The research has been completed and a web-based information product is currently in production.

CMHC Project Officer : *Susan Fisher*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22800200
STATUS : Ongoing

IT'S ALL ABOUT HOUSING: SUSTAINABLE, PLANNING PRACTICE AND HOUSING FORM IN THE OAK RIDGES MORAINE

The objective of this project is to examine the legacy of planning policy in the Oak Ridges Moraine (ORM) region. The scope of the research centres on the impact and role of housing on growth and institutional conflict in the Moraine region. The analysis will provide a guide for potential planning actions.

CMHC Project Officer : *Steve R Jacques*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 25250205
STATUS : Ongoing

LANDSCAPE GUIDE FOR CANADIAN HOMES

This guide will help you meet your home landscape needs while respecting the natural environment, and saving time and money, whether you want a radical makeover, are starting from scratch or want to spruce up an old garden. The guide shows how to go from ideas, to plan, to real life, by describing the design process and providing many tips on materials and technical solutions as well as maintenance tips. These tips relate to a wide range of landscape elements like plants, soil, ponds, slopes, stormwater and hard surfaces, such as decks and patios. These tips can be used by do-it-yourselfers or even those that are hiring a professional to design, prepare technical documents or install the design.

Prepared by Daniel Lefebvre, Landscape Architect, Rousseau Lefebvre Architecture de paysage and Susan Fisher, Landscape Architect, Senior Researcher, Canada Mortgage and Housing Corporation. Ottawa: CMHC, c2004. 175 pages

Order number: 63523 **Price: $19.95 + GST and handling charges

Nota : Aussi disponible en français sous le titre : L'aménagement paysager chez soi – Guide canadien

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products

MARKET TRANSFORMATION OF GREEN COMMUNITY DESIGN AND RESIDENTIAL HOUSING IN THE CITY OF VAUGHAN

This research will develop a local action plan for increasing the adoption of best practices in green community design and green residential housing construction in the City of Vaughan, Ontario. The project will create a framework of best practices in green community design and green residential housing construction and benchmark the current state of best practices in the City. Barriers to and levers for promoting more extensive market penetration of best practices will be defined and a plan will be created for accelerating and monitoring the use of best practices within the City. The project is being carried out as part of the Toronto and Region Conservation Authority's Living City Centre program.

CMHC Project Officer : *Cynthia Rattle*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 28370220

STATUS : Ongoing

NEW

RESIDENTIAL INTENSIFICATION CASE STUDIES: BUILT PROJECTS

This project profiles examples of residential projects that have overcome the barriers to intensification and are generally considered to be successful by the developers, residents and municipal officials. The report profiles 23 completed intensification projects. The selection of case studies attempts to strike a balance between regional representation, different urban contexts (e.g. downtown, waterfront, suburban, brownfield), and different types of intensification (e.g. redevelopment, infill, adaptive re-use). For each case study, the research team interviewed the developer, the municipal official most familiar with the project and a number of residents.

Each residential intensification case study provides the following information:, the address of the project, the name of the developer, the date a project was completed, the site area, the number and type of residential units, the floor area, gross residential density, landscaped open space, maximum height of the buildings, parking, non-residential units, pre-development usage and the selling or renting price per unit. Each case study also gives an overview of the project, the success factors, obstacles and the lessons learned from the perspectives of developers, municipal officials or residents.

Prepared by Robert Barrs, Holland Barrs Planning Group Inc. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 2004. 1 volume in various pagings

Nota : Aussi disponible en français sous le titre : Études de cas sur la densification résidentielle : projets réalisés

Note: No. 04-014 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report (Order number 63520) and Research Highlight

AVAILABILITY : CMHC Information Products

RESIDENTIAL INTENSIFICATION CASE STUDIES: MUNICIPAL INITIATIVES

For the last 50 years, development patterns in Canada have emphasized building out onto greenfield lands at the urban edge at a rate that has outstripped the rate of population growth. This development pattern has resulted in the loss of farmland and natural areas, rising car dependency and traffic congestion. Moreover, many municipalities lack the resources to pay for the infrastructure needed to support expansion into greenfield areas.

One of the ways municipalities have sought to address these issues is through residential intensification, i.e., encouraging housing development in existing urban areas where infrastructure and transit services are already in place. Infill development, adaptive reuse, brownfield development, lot splitting and secondary suites are examples of intensification that can result in the following:

- Reduce infrastructure costs;
- Use land more efficiently;
- Preserve rural and natural areas outside existing urban boundaries;
- Revitalize urban areas in decline; and
- Create more transportation choice through easier access to daily destinations like work, shopping and entertainment (e.g., mixed-use, pedestrian- and transit-oriented neighbourhoods).

Despite the considerable potential benefits, intensification faces a series of practical challenges:

- Higher development costs;
- Neighbourhood opposition;
- Regulatory issues.

This study aims to profile successful examples of municipal initiatives that have helped to overcome obstacles such as these, either by removing barriers or providing positive incentives. Most importantly, they have resulted in concrete results "on the ground," in that they have helped trigger or facilitate projects that may not have otherwise gone ahead. The report profiles 12 case studies of local initiatives that support intensification. This document is intended to be of use to municipal officials and other stakeholders across the country who may be looking for mechanisms with which to encourage intensification.

Prepared by Ray Tomalty, Co-operative Research and Policy Services. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 2003. (Healthy Housing and Communities Series)

Nota : Aussi disponible en français sous le titre : Études de cas sur la densification résidentielle : initiatives municipales

Note: No. 04-002 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : Completed report (Order number 63421) and Research Highlight

AVAILABILITY : CMHC Information Products

RETROFIT OPPORTUNITIES FOR GREYFIELD REDEVELOPMENT IN SMALL AND MEDIUM SIZE ONTARIO CITIES

The research project will explore the issue of greyfields redevelopment. The two research methods for this project will include a literature review and case study work. Emphasis will be given to the latter method so as to provide tangible examples of how this approach to planning and development can feasibly be put into practice.

CMHC Project Officer : *Karen A Gregory*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 30620200

STATUS : Ongoing

SITE CONTROL FOR SUSTAINABLE COMMUNITY DEVELOPMENT

This External Research Program project will:

- review relevant literature pertaining to market mechanisms for sustainable community development, with particular attention to site control and land assembly and provide case study examples of where they have been used;
- develop two detailed case studies of examples in BC where market mechanisms have been attempted (e.g., Community Development Corporations, Community Land Trusts) successfully, as well as cases where no mechanisms were in place;
- articulate the elements of existing market mechanisms that could be used for site control for sustainable community development in the Canadian context;
- identify barriers and obstacles within the Canadian policy context for these mechanisms; and
- identify and recommend strategies and processes for overcoming these obstacles.

CMHC Project Officer : *Fanis Grammenos*	***CIDN*** : 28370213
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

SMART GROWTH IN CANADA: IMPLEMENTATION OF A PLANNING CONCEPT

This project will do a critical assessment of the smart growth movement by attempting to find answers to the following questions: Which cities in Canada have made genuine efforts to adopt the new approach and alter their development patterns in a fundamental way? What successes have these cities experienced and where have they failed? What are the reasons behind both successes and failures? And what are the lessons we can draw for the viability of the new approach in the Canadian context? To address these questions, six Canadian municipalities will be selected in different jurisdictions, of varying sizes, that have a reputation of being leaders in smart growth. The project will look at what they have proclaimed as their goals and policies, and will evaluate, through an in-depth case study approach (reviewing planning documents, collecting statistics, interviewing relevant officials), what they have actually done to implement the stated goals and what they have achieved "on the ground".

CMHC Project Officer : *Fanis Grammenos*	***CIDN*** : 26470208
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

TOOLS FOR PLANNING FOR LONG-TERM SUSTAINABILITY: THE CITIES^{PLUS} DESIGN CHARRETTES

This document addresses the concept of planning for long-term urban sustainability, and focuses on one important tool that was successfully used in preparing the cities^{PLUS} 100-year plan for urban sustainability in Greater Vancouver: the design charrette. The first section in this publication elaborates on the key concepts and approaches underlying long-term planning, while the second section provides a case study of some of the results of applying the charrette tool during the cities^{PLUS} project.

Prepared by Lourette Swanepoel, Elisa Campbell and Sebastian Moffatt. A cities^{PLUS} publication produced by the Sheltair Group Inc. CMHC Project Officer: Norm Connolly. Ottawa: Canada Mortgage and Housing Corporation, c2003. 75 pages

Note: No. 04-003 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Final%20charrette%20manual(w).pdf

TOWN OF MILTON ECO-TECH VILLAGE PILOT PROJECT URBAN DESIGN CHARRETTE: MAKING CHOICES TOWARDS SUSTAINABILITY

The purpose of this project was to create a compelling and sustainable vision for an urban village that serves as a model for growth in the Town of Milton. CMHC provided financial support and participated in an urban design charrette led by the Town of Milton, Ontario to create visual and narrative images of the concepts and potential of the Eco-Tech Village Pilot Project. This design charrette was a link between the initial visioning exercises held during 2002 and the creation of development options for the site later in 2003 and 2004.

Note: No. 04-011 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : CMHC Information Products and CMHC web site

UNIVERCITY: ASSESSING CONSUMER DEMAND FOR SUSTAINABLE DEVELOPMENT IN GREATER VANCOUVER

UniverCity is a new community that is being developed at Simon Fraser University (SFU) in Burnaby, B.C. It is intended to be a sustainable community that will eventually house 10,000 residents in 4,500 homes and contain approximately 250,000 ft2 of commercial and office space. Simon Fraser UniverCity Community Corporation is a wholly owned subsidiary of SFU and is the land developer for this project.

Canada Mortgage and Housing Corporation (CMHC) frequently works with local stakeholders and other public or private partners to encourage greater housing choice, improve affordability, or support housing innovation. To encourage market adoption of Healthy Housing™, and to encourage developers to "push the envelope" in terms of greater energy efficiency, improved indoor air quality, and water conservation, CMHC, Greater Vancouver Regional District (GVRD), Natural Resources Canada and UniverCity participated in an Integrated Design Charrette in September 2002. This charrette provided the opportunity for developers and their design teams, to explore ways of incorporating UniverCity's Green Building Guidelines into three development proposals. An online version of the Development Guidelines can be found at www.univercity.ca

Experts with experience in the integrated design process acted as facilitators and provided support to the design teams. Resource people complemented the developers' teams, bringing expertise as quantity surveyors, landscape specialists, sustainability consultants, solar energy advisors, municipal planners and utility representatives.

As the two-day charrette progressed, several participants noted a distinct lack of information on market demand for "greener," healthier and more sustainable housing. Since some "green" building design elements may incur additional up-front construction costs, it is critical to understand the level of consumer interest and willingness to pay for such features. As one of the sponsors for this event, CMHC agreed to conduct a study to quantify consumer demand for Healthy Housing in order to demystify and bring clarity to the local debate on "where home buyers are at" in terms of sustainable development. This study was designed to identify the features that appeal to consumers and how much extra they would be willing to pay for these features.

A POLLARA Report for Canada Mortgage and Housing Corporation. CMHC Project Officer: Norm Connolly. Ottawa: Canada Mortgage and Housing Corporation, 2003. 60 pages

Note: No. 04-022 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/UniverCity%20FINAL(w).pdf

NOTE: See also p. 62-65

WOMEN OFFENDERS: CHARACTERISTICS, NEEDS AND IMPACTS OF TRANSITIONAL HOUSING: FINAL RESEARCH REPORT

This document presents the findings of a research project that examined the personal characteristics, housing and housing-related needs of women offenders and the importance of post-prison transitional housing in helping women offenders successfully reintegrate into the community.

There were three parts to this research project. A longitudinal study component compared criminal justice, housing, health and other outcomes of a small group of women who had received transitional post-prison housing with women who had not received this type of housing support. The second component was a literature review which reviewed the characteristics of women offenders, their housing and housing-related needs, and the impacts of being involved in post-prison transitional housing. A survey of seventeen key respondents working with women offenders in the Vancouver region was also undertaken to identify the housing related needs of women offenders and housing services that are available.

The longitudinal comparison study involved women who resided at Pathways, a nine unit transitional housing program for women who have left the custodial environment (prison and parole facilities) and who require assistance with reintegration in order to successfully function in the community. Pathways is managed and staffed by the Elizabeth Fry Society of Greater Vancouver. The goal of Pathways is to provide stable transitional safe, secure and flexible housing, supportive programs and counseling for high risk women offenders in order to increase their ability to live independently and to assist in their social integration into the community so that they do not commit further crimes or return to prison. The comparison group was drawn from Columbia House residents. Columbia House is a community residential facility for women on parole that offers some support, counseling and assistance as well as housing with 24 hour staffing.

The most significant improvements in the Pathways group in comparison to the Columbia House group were related to the lack of subsequent criminal charges or returns to custody, the increase in stable, non-transient, safe and secure housing, improvements in health and nutritional status, the increased ability of women to prepare food at home and reduced levels of self-described drug/alcohol misuse. Pathways participants were slightly more involved in specific job training programs and had experienced fewer problems finding a place to sleep at night. Pathways women also reported fewer mental health disorders at the final interview.

Levels of income decreased for both groups during the study (possibly due to less reliance on illegal forms of income), but there was a significant improvement in the number and frequency of personal and family contacts in both groups. There were also improvements in feelings of self-worth and a sense of hopefulness in both groups. However, at the final interview, three out of seven of the Pathways participants still felt that they had problems making decisions or lacked sufficient skills to handle life well.

The burden of issues and problems experienced by most women offenders suggests that program support and counseling needs to be delivered in conjunction with transitional housing. Without the provision of stable and safe housing, it is doubtful whether issues related to health, addictions, mental health, relationships and other, can be addressed.

Prepared by Janet Currie, Focus Consultants. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2004 (External Research Program Research Report) 118 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC%20Women%20Offenders(w).pdf

CMHC RESEARCH REPORT LISTINS

To provide quick and comprehensive access to CMHC research published on a given topic, the Canadian Housing Information Centre compiles comprehensive listings of housing research produced over a number of years on certain topics. Topics chosen are those for which there is ongoing client interest and/or for which CMHC has published considerable research. To obtain an electronic, faxed or mailed copy of any of the lists below, contact the Canadian Housing Information Centre at: 1-800-668-2642 or e-mail us at: chic@cmhc.gc.ca

Listings available at this time include:

- Aboriginal Housing
- Acoustics
- Affordable Housing
- Airtightness
- Basements, Foundations and Crawl Spaces
- Concrete
- Condominiums
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- Environmental Site Assement and Contaminated Lands
- Healthy Housing
- Heating and Ventilation
- Homeless
- Housing and Women
- Housing Export Opportunities
- Housing for Older Canadians
- Housing for Persons with Disabilities
- Indoor Air Pollution
- Infrastructure
- Lead
- Log Home Construction
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- Moisture Problems
- Mortgages and Housing Finance
- Northern Housing
- Rental Housing
- Residential Construction Waste
- Residential Renovation
- Self Help Housing
- Social Housing
- Straw Bale Housing
- Sustainable Development
- Water Conservation, Reuse and Management

ABOUT YOUR HOUSE SERIES

Fact sheets on common housing questions, issues and problems.

These documents are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at: http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/abhose_060.cfm

Print copies can be obained by calling 1-800-668-2642

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62043	CE 9	**Maintaining Your HRV** For a clean and healthy living environment, review the seven steps to maintaining the Heat Recovery Ventilator (HRV). Aussi disponible en français sous le titre : L'entretien du VRC
60339	CE 10	**Wood Heat Safety in an Emergency** Whether you often use a wood stove or a fireplace, or are coping with an emergency loss of electricity, learn how to safely use wood to heat your home. Aussi disponible en français sous le titre : Le chauffage au bois en toute sécurité lors d'une situation d'urgence
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60360	CE 12	**Tips for Post-storm Tree Care** Practical pruning advice to restore the health and shape of trees damaged by ice or wind storms. Aussi disponible en français sous le titre : Le soin des arbres après la tempête
62034	CE 13	**Attic Venting, Attic Moisture, and Ice Dams** How do you deal with a leak in the ceiling? How should an attic be properly vented? How do you eliminate ice dams? This fact sheet will answer these and other attic related questions. Aussi disponible en français sous le titre : Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62035	CE 14	**Carpet Streaking** Does your carpet have permanent dark stains near baseboards, air registers or under doorways? Find out what causes carpet streaking and what you can do about it. Aussi disponible en français sous le titre : Taches en traînée sur les moquettes
62036	CE 15	**Removing Ice on Roofs** Whether you have a sloped or flat roof, learn techniques that will help you deal with extensive roof icing or ice dam problems. Aussi disponible en français sous le titre : L'enlèvement de la glace sur les toitures
62037	CE 17	**The Importance of Bathroom and Kitchen Fans** Choosing the proper kitchen and bathroom fans is important for improving indoor air quality and maintaining ideal humidity levels. Aussi disponible en français sous le titre : Importance des ventilateurs de cuisine et de salle de bains
62038	CE 18	**How to Read a Material Safety Data Sheet (MSDS)** Reading and understanding the Material Safety Data Sheet (MSDS) provides product information about product hazards and the necessary safety precautions to follow when using it. Aussi disponible en français sous le titre : Comment déchiffrer une fiche technique sur la sécurité des substances (FTSS)
62039	CE 19	**Insulating Your House** Choose the right insulation to reduce the amount of energy you use and to make your home more comfortable. Aussi disponible en français sous le titre : L'isolation de votre maison
62040	CE 21	**Log Homes: Frequently Asked Questions** A list of questions and answers concerning the unique design and building considerations for log homes. Aussi disponible en français sous le titre : Foire aux questions - maisons en rondins
62041	CE 22	**Your Furnace Filter** To reduce exposure to airborne particles, choose the furnace filter that best suits your needs. Aussi disponible en français sous le titre : Le filtre de votre générateur d'air chaud

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62042	CE 23	**Water-Saving Tips for Your Lawn and Garden** Often water is applied inefficiently, resulting in significant waste due to over watering, evaporation or run-off. Here are some general watering tips to avoid such waste. Aussi disponible en français sous le titre : Comment entretenir vos pelouses et jardins en économisant l'eau
60417	CE 24	**Backup Power for Your Home** The top ten tips in choosing the appropriate backup system to provide electricity to your home in the event of a prolonged power failure. Aussi disponible en français sous le titre : Alimentation de secours pour votre maison
62046	CE 25	**Carbon Monoxyde** A list of questions and answers dealing with keeping Carbon Monoxide out of your home and to help you choose the right CO detector. Aussi disponible en français sous le titre : Le monoxyde de carbone
62277	CE 26a	**Hiring a Contractor** How do you find the "right" contractor for you? What should go in a contract? What are liens, holdbacks and completion certificates? Make sure you get what you want and pay for when hiring a contractor. Aussi disponible en français sous le titre : Le Choix d'un entrepreneur
62351	CE 26b	**Sample Renovation Contract** A detailed written contract between you and the contractor you hire is essential to any renovation or home repair project, no matter its size. Aussi disponible en français sous le titre : Modèle de contrat de rénovation
62045	CE 27	**Choosing a Dehumidifier** Air that is too damp can cause condensation on windows, water damage to materials, mold and even wood rot. Choose the right dehumidifier to regulate the humidity in your home. Aussi disponible en français sous le titre : Le Choix d'un déshumidificateur
	CE 28	**The Renovation Project (12 parts)**
		This series will assist you in making informed decisions before you renovate. Each easy-to-read fact sheet helps you ask the key questions, reviews the available options and discusses the consequences if certain aspects of the renovation are overlooked. Advance planning is the key to successful renovations. These fact sheets help you plan, assess, and avoid surprises. Achieve the results you want by doing your renovation right the first time.

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62246	CE 28a	**Assessing the Renovation Project** Before renovating, it's important to assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project. Aussi disponible en français sous le titre : Évaluation du projet de rénovation
62248	CE 28b	**Renovating your Basement - Structural Issues and Soil Conditions** Renovating a basement can add value and extra living space to a home. Fixing foundation problems before renovating is essential to preserve the durability and structure of the house. Aussi disponible en français sous le titre : Rénovation du sous-sol - Aspects structuraux et conditions du sol
62250	CE 28c	**Renovating Your Basement - Moisture Problems** Is there condensation on the basement windows? Are there white chalky stains on the foundation? Do the carpets smell musty? Creating a clean, dry and healthy living space is a critical first step. Aussi disponible en français sous le titre : Rénovation du sous-sol - Problèmes d'humidité
62252	CE 28d	**Renovating Your Kitchen** The kitchen is often the most used room in the house and kitchen renovations typically have the highest financial payback. Conduct a pre-renovation inspection and prioritize the most desirable features for your new kitchen. Aussi disponible en français sous le titre : Rénovation de la cuisine
62254	CE 28e	**Renovating Your Bathroom** Bathroom renovations offer the second highest financial payback rate and are one of the most common home improvement projects. Use this fact sheet to check for problems before you renovate. Aussi disponible en français sous le titre : Rénovation de la salle de bains
62256	CE 28f	**Window and Door Renovations** Do you want more natural light in your living area? Are you concerned about security? Before repairing or replacing windows and doors, consider all of the factors outlined in this fact sheet. Aussi disponible en français sous le titre : Nouvelles portes et fenêtres

Order no.	Series no.	Title
62258	CE 28g	**Repairing or Replacing Roof Finishes** Regular maintenance and periodic roof inspections will identify problems before they cause costly damage to your home. Learn about the key factors that will determine whether you should repair or replace your roof. Aussi disponible en français sous le titre : Réparation ou remplacement de la couverture
62260	CE 28h	**Repairing or Replacing Exterior Wall Materials** Exterior finish materials must prevent rain and snow from penetrating the building and causing moisture damage. Repairing or replacing exterior wall finishes will protect and preserve the durability and structure of the home. Aussi disponible en français sous le titre : Réparation ou remplacement du revêtement des murs extérieurs
62262	CE 28i	**Energy Efficient Upgrade - Mechanical Systems** Upgrading the heating, cooling and ventilation (HVAC) equipment is the best way to create a healthy, comfortable and less expensive home to operate. Before altering these, it is important to understand how the overall performance of the house will be affected. Aussi disponible en français sous le titre : Améliorations éconergétiques - installations mécaniques
62264	CE 28j	**Energy Efficient Upgrade - The Building Envelope** The envelope, or outer layer, of your house separates living space from the outdoor elements. Improving it can result in a better insulated, more airtight home that is easier to heat. Aussi disponible en français sous le titre : Améliorer l'efficacité énergétique - L'enveloppe du bâtiment
62266	CE 28k	**Assessing the Comfort and Safety of Mechanical Systems** The heating, ventilating and air conditioning (HVAC) systems are a vital part of your home. Ensure that your mechanical systems are operating safely and efficiently. Aussi disponible en français sous le titre : Évaluation de vos installations mécaniques - confort et sécurité
62268	CE 28L	**A New Addition** Before building an addition, clearly identify the features you need and inspect the current structure and mechanical systems to be sure they can support the new addition. Aussi disponible en français sous le titre : Une nouvelle annexe

Order no.	Series no.	Title
62044	CE 29	**Should you get your Heating Ducts Cleaned?** Should you get your heating ducts cleaned? Will clean ducts result in improved air quality? When is duct cleaning most appropriate? This fact sheet separates fact from fiction. Aussi disponible en français sous le titre : Doit-on faire nettoyer les conduits de chauffage?
63322	CE 30	**Water Damage, Mold and House Insurance** You've had water damage in your house due to a burst pipe, a roof leak, or a heavy summer storm. You hope that your insurance will cover the damage. What to do? Aussi disponible en français sous le titre : Moisissure, dommages causés par l'eau et assurance habitation
62226	CE 31	**Understanding and Dealing with Interactions Between Trees, Sensitive Clay Soils and Foundations** Is the size, type or siting of a tree affecting your foundation? Understanding the interactions between trees, soils and the foundation can help you avoid foundation shifting, cracks and other damage. Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence
62288	CE 33	**CMHC Garbage Bag Airflow Test** This simple test uses an ordinary garbage bag to help you estimate airflow from your furnace registers, bathroom exhaust fan or clothes dryer exhaust. Aussi disponible en français sous le titre : Essai de mesure du débit d'air à l'aide d'un sac à ordures
62795	CE 34	**Your Septic System** A primer on the components, operation and proper maintenance of an in-ground septic tank and system. Aussi disponible en français sous le titre : Votre installation d'assainissement
62839	CE 35	**Hiring a Home Inspector** One of the best ways to understand about a home's condition, habitability and safety is to hire a professional home inspector. Aussi disponible en français sous le titre : Le Choix d'un inspecteur en bâtiment
62341	CE 36	**The Condominium Owners' Guide to Mold** Special advice for identifying and removing mold in a condo, and solving the problems that cause it. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires

Order no.	Series no.	Title
62935	CE 39	**Buying a Toilet** Advice and tips on what to look for when buying a toilet. Aussi disponible en français sous le titre : L'achat de toilettes
63319	CE 40	**Buying a House with a Well and Septic System** Information on what to inspect and test if a property has a well and/or septic system. Includes checklists for potential buyers. Aussi disponible en français sous le titre : L'achat d'une maison avec un puits et une installation septique
62953	CE 41A	**UV Water Treatment** Describes the ultra-violet light water treatment process, and the pros and cons of using such a system. Aussi disponible en français sous le titre : Traitement de l'eau aux rayons ultraviolets (UV)
62898	CE 41B	**Water Distillers** Everything you ever wanted to know about water distillers from how they work to how to install and maintain them. Aussi disponible en français sous le titre : La distillation de l'eau
62896	CE41C	**Water Filters** Consumer series of household water treatment options. Water filters are an inexpensive method of additional water treatment. Some filters can remove certain contaminants such as lead. Aussi disponible en français sous le titre : Filtres à eau
62946	CE 41D	**Water Softeners** Find out how a water softener works and obtain information on whether you should consider installing one. Aussi disponible en français sous le titre : Les adoucisseurs d'eau
62962	CE 41E	**Reverse Osmosis Water Treatment** Describes the reverse osmosis water treatment process, and provides the pros and cons of using such a system. Aussi disponible en français sous le titre : Filtration de l'eau par osmose inverse
62966	CE 42	**Canada's Construction System** The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada. Aussi disponible en français sous le titre : Système de construction canadien

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
63134	CE 44	**Painting: Walls, Ceilings and Floors** This factsheet provides general information on: selecting paints, e.g. latex (water based) or alkyd (oil based); types of paint and paint finishes, e.g. low or high sheen, sealer, primer, melamine; estimating quantity of paint required; preparing for painting; and painting tips. Aussi disponible en français sous le titre : La peinture : murs, plafonds et Planchers.
63144	CE 45	**Flooring Choices** A quick summary of the advantages, considerations, installation, maintenance, and costs to think about when choosing resilient, laminate, and wood flooring, as well as carpet and ceramic tile. Aussi disponible en français sous le titre : Les revêtements de sol
63349	CE 46	**Fighting Asthma in Your Home** Practical tips to help people with asthma improve the indoor air quality of their home. Aussi disponible en français sous le titre : Combattre l'asthme à la maison
63218	CE47	**Home Maintenance Schedule** This factsheet provides a listing of the regular home maintenance tasks which should be done at various times throughout the year to protect the condition of your house. Aussi disponible en français sous le titre : Calendrier d'entretien de votre maison
63227	CE48	**Replacing Your Furnace** This fact sheetprovides information for consumers who are replacing their existing furnace with a new one. It deals with fuel choice, furnace selection, and furnace sizing. Aussi disponible en français sous le titre : Le remplacement d'un générateur de chaleur
63235	CE 49	**Getting Your House Ready to Sell** Tips for homeowners who wish to get their house ready to sell. Aussi disponible en français sous le titre : Ce qu'il faut faire avant de mettre votre maison en vente
63436	CE50	**Avoiding Basement Flooding** Basement flooding leads to damage of the finishing material and possible growth of mold. This document reviews why basements flood and how to prevent floods from occurring. Aussi disponible en français sous le titre : Comment prévenir les inondations de sous-sol

63486	CE51	**Get to Know Your Soil** This fact sheet provides practical tips on how to analyse soil so that you can select the plants that are suited to the soil you have on your property. Once you have determined the soil conditions, it provides tips on how to amend it, if needed. Aussi disponible en français sous le titre : Apprenez à connaître votre sol
63488	CE52	**Low-Maintenance Lawns** Low-maintenance lawns help to reduce the time, costs, water, pesticides, fertilizer and energy used to maintain lawns. This fact sheet describes the benefits and provides practical tips on how to install and maintain low maintenance lawns, including species selection. Aussi disponible en français sous le titre : Les pelouses à faible entretien
63490	CE53	**Rain Gardens: Improve Stormwater Management in Your Yard** Rain gardens are landscaped areas designed to receive stormwater and allow it to infiltrate into the soil. This fact sheet describes the benefits and provides practical tips on how to install and maintain gardens. Aussi disponible en français sous le titre : Un jardin pluvial pour mieux gérer les eaux de ruissellement dans votre cour
63492	CE54	**Understanding Your New Home Sales Contract** This factsheet provides information on some of the terms and provisions that you may find in a new home sales agreement to illustrate what a contract can cover and an explanation why. Aussi disponible en français sous le titre : Comprendre le contrat de vente de votre maison neuve
63495	CE55	**Selecting A New Home Builder** This factsheet provides information on how to find and what to look for and consider when searching for the right builder to build your new home. Aussi disponible en français sous le titre : Le choix d'un constructeur d'habitations
63637	CE56	**Preventing Falls on Stairs** This fact sheet tells you about some of the ways you can reduce the risk of falling on or from residential stairs. Aussi disponible en français sous le titre : Comment prévenir les chutes dans les escaliers
63730	CE57	**Efficient, Convenient Wood Heating** This is a short guide to the proper use of woodburning appliances in homes: what appliances to choose, how to operate them efficiently, what wood to burn, how to cut and store it, etc. Aussi disponible en français sous le titre : Le chauffage au bois pratique et efficace

ABOUT YOUR HOUSE SERIES

63683	CE58	**The ABC's of Windows** This document will help consumers understand and select window performance levels with respect to airtightness, rain penetration and wind resistance appropriate for their climatic (and geographical) location and exposure conditions Aussi disponible en français sous le titre : L'ABC des fenêtres

ABOUT YOUR APARTMENT SERIES

63419	AE1	**Solving Odour Transfer Problems in Your Apartment** One of the most common problems experienced by the occupants of apartment buildings is the transfer of objectionable odours from one apartment to another. Tobacco smoke and cooking odours top the list of complaints. This fact sheet explains how odours are transferred, and offers a number of potential solutions. Some are very easy to implement and others should be done with the agreement of the building management. Some are trial and error. Solving the problem can take perseverance. Aussi disponible en français sous le titre : Enrayez la transmission d'odeurs dans votre appartement

ABOUT YOUR HOUSE - **NORTH SERIES**

VOTRE MAISON - **DOSSIER DU NORD**

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse wastewater in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities.

Order no.	Series no.	Title
62303	North Series 1	Building with Structural Panels -- Repulse Bay
62304	Dossier du Nord	Maison à panneaux isolants de construction à Repulse Bay
62295	North Series 2	On-site Wastewater Reclamation Systems for the North
62297	Dossier du Nord 2	Installations de recyclage sur place des eaux usées dans le nord
62329	North Series 3	Snowshoe Inn, Fort Providence Co-generation Model
62330	Dossier du Nord 3	Modèle de cogénération du Snowshoe Inn, Fort Providence
62298	North Series 4	Residential Foundation Systems for Permafrost Regions
62299	Dossier du Nord 4	Fondations pour les bâtiments résidentiels construits sur le pergélisol
62154	North Series 5	Eagle Lake Healthy House
62155	Dossier du Nord 5	La maison saine d'Eagle Lake
62313	North Series 6	Arctic Hot Roof Design
62314	Dossier du Nord 6	Conception de toits chauds pour climat arctique
63050	North Series 8	How to Prevent Plumbing and Heating Vent Stack Freeze-up
63051	Dossier du Nord 8	Prévenir le gel des colonnes de ventilation de plomberie et des conduits d'évacuation de l'appareil de chauffage
63394	North Series 9	Fancoil Integrated Combination Heat and Domestic Hot Water Systems
63395	Séries du Nord 9	Installation de chauffage des locaux et de l'eau intégrée à un ventilo-convecteur

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Brief descriptions of CMHC research papers you may wish to obtain.

These research highlights are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at:

http://www.cmhc-schl.gc.ca/publications/en/rh-pr/index.html

Print copies can be obained by calling **1-800-668-2642**

Order no.	Series no.	TITLE
63735	04-129	Durable Wood-Frame Construction for all Climatic Zones: A Companion to Canadian Wood-Frame House Construction
63728	04-127	Comparison of Under-Floor Insulation Systems
63726	04-126	Update of Roof Truss Designs with Nailing Schedules
63641	04-125	Residential Sources of Lead
63677	04-124	Summary of Research on Water Resistive Barriers
63675	04-123	Assessing the Impact of Thickness on the Performance of Stucco Cladding
63673	04-122	Comparison and Analysis of Provincial Builder and Renovator Industry Programs
63635	04-121	Field Testing of "Spillage- Resistant" Appliances
63465	04-119	Diagnosing Attic Performance by Snow- and Frost-Melt Patterns
63620	04-118	Performance of Sprayed Polyurethane Foam on Indoor Foundation Walls
63615	04-117	Analysis of Ventilation System Performance in New Ontario Houses
63612	04-116	Energy Needs and Availability in Housing
63571	04-115	Building Canada: Phase One
63555	04-114	Investigating Claims Against Home and Property Inspectors
63557	04-113	Installation Guide for Residential Wood I-Joist Floor Systems
63547	04-112	Canadian Home Inspectors and Building Officials National Initiative Phase II: Development of National Certification and Accreditation Models
63528	04-111	Characterizing the Condominium Population of the Greater Ottawa Area, 1969-2002
63540	04-110	Strategies for Reducing Building Energy Use Via Innovative Building Envelope Technologies

63511	04-109	Maximum Performance Testing of Popular Water-Efficient Toilet Models
63542	04-108	Garage Performance Testing
63503	04-107	Survey of In-Suite Space and Domestic Hot Water Heating Systems In Multi-Residential Buildings
63400	04-105	Field Testing of an Integrated Ventilation Space Conditioning System for Apartments
63413	04-104	Practical Measures for the Prevention of Basement Flooding Due to Municipal Sewer Surcharge
63407	04-103	House Dust: A Useful Tool To Assess Microbial Contamination In Homes
63390	04-102	Calgary Integrated Design and Sustainable, Affordable Housing Charrette
63365	04-101	Residential Combustion Spillage Monitoring
63376	04-100	Improved Make-up Air Supply Techniques
63382	03-134	Safe Housing for Lightly Contaminated Lands
63370	03-133	Residential Combustion Venting Failure - A Systems Approach
63374	03-131	The Canadian Residential Duct and Chimney Survey
63326	03-129	Monitoring the Performance of a Retrofitted Preserved Wood Foundation
63333	03-128	Review of Hygrothermal Models for Building Envelope Retrofit Analysis
63328	03-127	Static and Dynamic Earthquake Testing of Rainscreen Stucco Systems for B.C. Residential Wood-Frame Construction
63339	03-125	Water Penetration Resistance of Windows - Study of Codes, Standards, Testing and Certification
63367	03-124	Water Penetration Resistance of Windows : Study of Manufacturing, Building Design, Installation and Maintenance Factors
63315	03-123	Integrated Community Solutions: Regina's Affordable, Sustainable Housing Design Charrette
63294	03-122	The impact of requiring HVAC system design submittal on system performance
63280	03-121	Ventilation Systems for Multi-Unit Residential Buildings: Performance Requirements and Alternative Approaches
63243	03-119	Reduction of Air Intake Contamination in High-Rise Residential Buildings

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
63257	03-118	Investigation of a Ground-Source Heat Pump Retrofit to an Electrically Heated Multi-Family Building
63237	03-117	Influence of an Electronic Air Cleaner on Indoor Ozone
63225	03-116	Qualification of the Degree of Acoustic Comfort Provided by Multi-Family Buildings - Phase II
63233	03-115	Case Studies of Major Energy Retrofits
63208	03-114	Technology Roadmap for Intelligent Buildings
63223	03-113	Dawson City Demonstration Monitoring Northern Ventilation
63206	03-112	Guidelines for On-Site Measurement of Moisture in Wood Building Materials
63204	03-111	Comparison of Modeled and Monitored Performance of a Wall Insulation Retrofit in a Solid Masonry Building
63214	03-110	Integrated Design Charrette for a Sustainable UniverCity Community
63200	03-109	Proper Retrofit Furnace Sizing
63188	03-108	Re-Sale of Leaky Condos: Did the Buyer Know?
63194	03-107	Design of Durable Joints Between Windows and Walls
63192	03-106	Cooling Rates of Houses During Extended Power Failures
63190	03-105	Penetration of Outdoor Particles Into a Residence
63186	03-104	Indoor Particulate and Floor Cleaning
63182	03-103	Incompatible Building Materials
63175	03-102	Seville Theatre Redevelopment Project: Integrated Design Process
63172	03-101	Mandatory Home Inspections on Resale Homes in Ontario
63132	03-100	Rain Water Harvesting and Grey Water Reuse
63102	02-137	Multi-Residential High Efficiency Clothes Washer Pilot Project
63065	02-135	Monitored Performance of an Innovative Multi-Unit Residential Building
62637	02-133	Positive Pressure Ventilation for High-Rise Buildings
63035	02-132	Alternative Wall Systems for Low-Rise Housing
63053	02-130	Evaluation of Vapour Diffusion Ports on Drying of Wood-Frame Walls Under Controlled Conditions
63044	02-129	Investigation Protocol for Evaluation of Post-Tensioned Buildings

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
63019	02-128	"Northern Landscaping: A Guide to Restoring Plants and Soil in Northern Communities"
63015	02-127	LeBreton Flats District Heating System Performance Assessment
63017	02-125	Healthy Indoors: Achieving Healthy Indoor Environments in Canada
62995	02-124	Dual-Flush Toilet Testing
62997	02-123	Green Roof Infrastructure Workshop
63022	02-120	Study of High-Rise Envelope Performance in the Coastal Climate of British Columbia
62976	02-118	Compliance of Ventilation Systems Installed to Meet Proposed Changes to the 1995 NBCC
63104	02-117	Research Project on the Noise Produced by DWV Pipes Made of Cast Iron, PVC and ABS
62894	02-116	Wood Usage in Straw Bale House Construction
62892	02-115	Energy Use in Straw Bale Houses
62890	02-114	Defining the Convective Driving Force for Soil Gas Intrusion into Houses
63116	02-112	Community Energy Management – Foundation Paper
62881	02-109	Composite Masonry Wall Ties
62888	02-108	Noise Isolation Provided by Gypsum Board Partitions
62955	02-105	Achieving Healthy Indoor Environments: A Review of Canadian Options
62944	02-104	Technology Dissemination: Triggering Innovation Adoption in Canada's Home Construction Industry
62950	02-103	Moldy Houses: Why They Are and Why We Care & Additional Analysis of Wallaceburg Data: the Wallaceburg Health and Housing Studies
62968	02-102	Transforming your practice: integrated design charrettes for sustainable buildings
62876	02-101	Healthy High-Rise: A Guide to Innovation in the Design and Construction of High-rise Residential Buildings
62960	02-100	Final Assessment of Conservation Co-op's Greywater System

RESEARCH HIGHLIGHTS: SOCIO-ECONOMIC SERIES

Brief descriptions of CMHC research papers you may wish to obtain.

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Print copies can be obtained by calling 1-800-668-2642

Order no.	Series no.	TITLE
63695	04-036	2001 Census Housing Series Issue 6: Aboriginal Households
63685	04-035	Developing a Methodology for Tracking Homeless People over the Long Term
63645	04-034	Title Insurance and the Canadian Land Conveyancing System
63618	04-033	A Review of Training and Delivery Options Concerning Aboriginal Housing
63592	04-032	An International Comparison of Housing Need Indicators in Australia, Canada, England and the United States
63600	04-031	An Examination of the use of Domestic Space by Inuit Families Living in Arviat, Nunavut
63639	04-030	The National Summit on Affordable Homeownership
63596	04-029	Comprehensive Community Planning: Experiences in Aboriginal Communities
63573	04-028	Intergenerational Homesharing
63580	04-027	2001 Census Housing Series: Issue 5 Growth in Household Incomes and Shelter Costs, 1991-2001
63575	04-026	Strategies to Preserve the Existing Rental Housing Stock in Greater Vancouver
63561	04-025	Refugee Housing Information Needs: Research Conducted in the Region of Niagara
63551	04-024	Assessment of the Outcomes for Habitat for Humanity Homebuyers
63545	04-023	Land Title Conveyance Practices and Fraud
63526	04-022	UniverCity: Assessing Consumer Demand for Sustainable Development
63501	04-021	Residential Integration of Youth Migrants in Quebec
63518	04-020	The Impact of the 1988 Basel Capital Accord and Prognosis for the Future

63509	04-019	Housing, Long Term Care Facilities, and Services for Homeless and Low-income Urban Aboriginal People Living with HIV/AIDS
63507	04-018	Lessons Learned from the Use of Performance Assessment Measures to Implement Sustainable Communities
63445	04-017	Transitional Housing : Objectives, Indicators of Success and Outcomes
63463	04-016	Housing and Population and Health - Research Framework
63440	04-014	Residential Intensification Case studies : Built Projects
63372	04-013	Insurance In Residential Construction: An Environmental Scan
63428	04-012	Consumer Support and Protection in Mortgage and Home Equity Based Borrowing : The U.S. Experience and Canadian Comparisons
63434	04-011	Town of Milton Eco-tech Village Pilot Project Urban Design Charette : Making Choices Towards Sustainability
63438	04-010	Housing Education Program: Eastmain Pilot Project
63415	04-009	Quantifying Universal Design: A Program for Implementation
63584	04-008	2001 Census Housing Series: Issue 4 Canada's Metropolitan Areas
63403	04-007	2001 Census Housing Series: Issue 3 The Adequacy, Suitability and Affordability of Canadian Housing
63405	04-006	House Prices, Borrowing Against Home Equity, and Consumer Expenditures
63380	04-005	Quality of Location and Quality-of-Life in Central Montréal Neighbourhoods
63378	04-004	Canadian Housing Fire Statistics
63417	04-003	Tools for Planning Long-Term Urban Sustainability: The CitiesPLUS Design Charrettes
63337	04-002	Residential Intensification Case Studies: Municipal Initiatives
63306	04-001	2001 Census Housing Series: Issue 2 - The Geography of Household Growth and Core Housing Need, 1996-2001
63363	03-024	An Examination of First Nations Housing Management Training Programs
63352	03-023	Housing Needs of Low Income People Living in Rural Areas: Literature Review
63330	03-021	Housing Quality and Children's Socioemotional Health
63296	03-019	Housing Options for Elderly or Chronically Ill Shelter Users

RESEARCH HIGHLIGHTS: SOCIO-ECONOMIC SERIES

Order no.	Series no.	TITLE
63206	03-018	Residential Integration of Youth with Immigrant Backgrounds in Montréal
63285	03-017	2001 Census Housing Series : Issue 1: Housing Affordability Improves
63292	03-016	Comparison of Provincial and Territorial Rental Practices
63287	03-015	Applicability of a Continuum of Care Model to Address Homelessness
63283	03-014	Governance in Organizations Addressing Homelessness
63255	03-013	Life Lease Housing in Canada: A Preliminary Exploration of Some Consumer Protection Issues
63253	03-012	Housing Needs of Low-Income People Living in Rural Areas: The Implications for Seniors
63278	03-011	Literature Review of Socio-economic Trends Affecting Consumers and Housing Markets
63245	03-010	Evaluation of Optimal Bath Grab Bar Placement for Seniors
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